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Railway Age

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Interest Well Directed

MUCH credit is due the Committee on the Design of Shops and Engine Terminals of the Mechanical Division for having taken cognizance of the demand for specific information on the layout of facilities for use in connection with car repairs. There is significance in the statement that many of the car repair plants in the country today are from 30 to 50 years old. Within recent years a real effort has been made on the part of those responsible for the design and operation of railway shops to incorporate production methods and equipment into railway shop practice and to profit by the practices brought out by the development of the country's modern industrial plants. Past attention in the railway field has been directed, for the greater part, to the development of locomotive repair shops, and the progress made has been gratifying. In the meantime, the institution of production methods, such as the progressive car repair system, has shown many car department officers that, even with ancient facilities, astonishing results may be obtained in car repair work. The realization of this fact has created an interest which has led to a demand for an intelligent analysis of conditions with a view to modernizing existing facilities and establishing precedents to be used in determining the most economical layout of new plants. The report presented by the committee contains many excellent suggestions which should prove valuable in laying out new or in improving existing facilities for passenger car repair shops. The recommendation that the committee be continued and present a later report on freight car shops indicates a growing interest in a department of railroad activity which, in the past, has suffered much from neglect.

Proposed Wheel Manual Looks Promising

THIS year's wheel report of the Mechanical Division, prepared under the direction of C. T. Ripley, chairman of the committee and chief mechanical engineer of the Atchison, Topeka & Santa Fe, ventures into a new field with the issuance of a 100-page manual on wheel shop practice which holds much of promise for higher standards and decreased cost of this important work. The labor involved in preparing the manual, checking practices and reaching a decision on disputed questions, must have been great, and the size of the manual, 100 six-inch by nine-inch pages, doubtless gives little indication of the number of hours of thought and discussion expended by the committee in its preparation. The book, referred to in the report as a Manual of Wheel Shop Practice, is really more than this, containing as it does sections on the manufacture, inspection and methods of testing car wheels. The committee stresses the fact that the manual

is not submitted as a completed work, the section on classification and causes of defects being particularly needful of added study and consideration. The members of the Mechanical Division are requested to furnish frank criticism and suggestions in order that in another year the manual may be revised and put in finished shape for issuance to mill inspectors, terminal inspectors, shop mechanics, supervisory officers and others interested. Most wheel shop foremen know in their own minds what practices are desirable but few have reduced these practices to writing so that shop mechanics can fully understand and intelligently carry out their work. By bringing this information to the men on the ground the manual will perform an important function.

What It Costs to Block a "Comer"

WHO loses when a supervisory officer displays special aptitude for his work, gradually acquiring duty after duty, and in the end becoming so valuable in one particular position that his superiors cannot see their way clear to replace and promote him? Such cases are not unknown in railway mechanical departments and they constitute a deadening influence which the department heads may well bend earnest efforts to remove. In the first place, the man himself loses. Possibly part of the blame may rest with him for not having trained a competent successor, but wherever the fault lies, he loses promotion and the railroad loses an opportunity to inspire a faithful employee with added incentive. The supervisor may be conscientious and continue the faithful performance of all his duties, but his most natural reaction on failing to receive suitable recognition for extra efforts is to say "What's the use?" and slump back into a rut, doing just enough work to avoid criticism. Moreover, the ambition of fellow supervisors is also stifled. How often has a shop foreman recognized in his general foreman a man of superior ability and yet seen him occupy the same position year in and year out without any advancement or material increase in pay. Such a foreman can hardly be blamed for looking to his own future in employment outside the railroad field. The railroads can ill afford either to lose or discourage progressive, thoroughly-trained under-foremen and this is probably the most serious result of failure to provide advancement properly earned. A study of business history will indicate that the industrial leaders who have been successful in bringing their enterprises to the highest level of efficiency are those who advanced subordinates as fast as they were fitted for added responsibility. Admittedly, the most important problem of the railroads is one of men rather than materials. They cannot afford to let a prospective superintendent of motive power spend too much time supervising a back shop stripping gang, running a rip track, or keeping an enginehouse night gang from going to sleep.

The Mechanical Division Meeting

WHAT about the meeting of the Mechanical Division of the American Railway Association at Chicago this week? Was it a success? If we consider the fact that the General Committee deliberately set out to hold a small or limited meeting and that it asked the supply representatives to keep away, then it may be said to have been fairly successful—we use the word fairly advisedly, however. If, on the other hand, we recognize the variety, importance and immensity of the problems confronting the mechanical department and the tremendous possibilities before that department—if we accept President Ashton's statement that there never was a time that the work of the Mechanical Division was more important than now or in the next year or two, or if we agree with President Loree of the Delaware & Hudson as to the possibilities of the mechanical department, which he so clearly outlined in the *Railway Age* of last week—then we are forced to the decision that the meeting of the Division was a more or less feeble effort which hardly scratched the surface.

In the first place, such reports as were made—many of them were excellent—were not available until a few days before the meeting. The members had no opportunity of reading them carefully and digesting them before coming to Chicago. The effect of this on the discussion was partially offset or camouflaged by having a few men present prepared discussions. Obviously, however, the members could not be expected fully to comprehend or intelligently to discuss technical reports which they had had no opportunity to study and analyze.

It is understood that the General Committee has passed a resolution to the effect that hereafter all committee reports must be ready 60 days in advance of the time of the annual meeting. Past experience, however, has clearly and repeatedly shown that something besides this is necessary if real results are to be attained. Someone must keep continually and everlastingly after the committees to see that they make good. Resolutions are hardly worth the paper they are written upon unless they are followed up and driven home. This resolution, because it is only one of a number of similar ones which have been adopted in past years, is quite likely to have the same effect as the cry of "Wolf!" on the part of the shepherd boy in the fable which we learned in the early grades at school.

The excuse is made that mechanical department officers are so busy that they cannot find time to attend committee meetings and plan and carry out the committee work. Are they any more busy than officers in other departments? Is there any reason why they cannot do as well as the members of the American Railway Engineering Association, the International Railway Fuel Association, the Railway Signal Section, the Purchasing and Stores Division of the A. R. A., the Railway Accounting Officers Association, and a number of others whose meetings have been growing more and more effective from year to year and whose reports are almost invariably prepared well in advance of the time of the meeting? Indeed, failure of a committee to get its report in hand well in advance of the annual meetings of some of these associations is regarded more or less as a disgrace and the entire committee is placed in an embarrassing position. The old American Railway Master Mechanics' and Master Car Builders' Associations were regarded as leaders among railroad associations. Today several other railway associations are regarded as more progressive than the Mechanical Division. Surely this is not because the field of the Mechanical Division is any less important than that of the others.

The question is being asked as to why the technical meetings of the Mechanical Division should be placed on a lower plane, or be regarded as of lesser importance, just because a big exhibit is not held in connection with them. There are possibly good reasons why it is not advisable to hold the great exhibit every year but surely this is no reason why the technical programs should not be just as strong or stronger than usual.

Why are the railway supply representatives discouraged from attending meetings which are not accompanied by an exhibit? Other railway associations, just as important and dignified as the Mechanical Division, and even more so, actually welcome the supply representatives to their meetings and encourage them to give their best thought and efforts in helping to develop and strengthen the technical programs. The railway supply companies for years have been recruiting outstanding men from the railway mechanical departments to help improve their products and methods. These men have kept in intimate touch with railroad developments and operation and because of their extended fields of investigation are splendidly equipped to help in the solution of railway mechanical problems. They are in position to make splendid contributions to the work of the Mechanical Division and most of them can be trusted to do this in a scientific attitude and in such a way as not to "toot their own horns." Why not encourage them to work shoulder to shoulder with the members of the association on such problems or phases of the work on which they can cooperate to the best advantage?

Naturally not all the railway supply representatives are qualified to take part in discussions or to engage in committee work. Why not include those supply representatives who are properly qualified and can be trusted to use good judgment as affiliate members of the Division? Some of the former railway mechanical officers now hold such memberships but many strong and capable technical men in the supply companies who would bring credit to the Division do not. Those who now hold affiliate memberships, therefore, do not feel free to exercise their privileges. It seems strange that more of these men are not now used for committee work, at least in an advisory capacity. Is it necessary, or advisable, that they be so carefully avoided and shunned?

What would it not have meant at the Chicago meeting if, instead of many of these high grade men remaining away from the meeting, (and feeling offended because of the deliberate request to absent themselves) they had been encouraged to attend? Whether they actually took part in the proceedings or not, they would have been available for consultation outside of the meeting and would undoubtedly have helped many of the members to see their way through complicated problems and situations which are now confronting them.

The *Railway Age* does not mean to infer that the meeting at Chicago was a failure. Several excellent reports were presented, the discussions, considering the handicaps, were exceptionally good, the heads of most of the mechanical departments were present, and there was a good tone to the whole affair. It did, however, fall far short of what it might have been.

We do not want to be misunderstood. The mechanical department is doing things—is making real and substantial progress, some roads in a large way. There are not a few mechanical officers, of various grades, who are possessed of rare and far-sighted vision. The thing that we speak for—plead for—is a larger release of the potential energy controlled by the Mechanical Division. The intelligent pooling of all the best thought and developments is essential in order that they may be properly assembled and appraised and that the mechanical field at

large may be helped and inspired to a larger degree than at present.

The mechanical department has passed through a difficult period in recent years. There are possibly good reasons why the Mechanical Division has not at times shown a larger degree of initiative. Surely, however, it is far from the mark to believe that the chief executive or any other element in the railroad world desires to discourage initiative on the part of the Mechanical Division.

What seems to be the difficulty? The suggestion has been made that the General Committee is very largely composed of elder statesmen—men at the heads of departments and of large interests who are not in position to give the time and attention to details of the work of the Division that is necessary and essential for the best results. The suggestion has also been made that if it is not advisable to include in the membership of the committee, more of the younger men who still have their spurs to win and who will put forth great energies to forward the work of the association if they are placed in positions of responsibility, that the General Committee appoint a strong sub-committee which can be entrusted with the detail work of developing and carrying out a progressive and far-sighted program. This will encourage the younger group and will develop a new point of view which may be more in accordance with the needs of the mechanical department in the present day.

President Aishton, who has kept in intimate touch with the General Committee and Chairman Tatum, and who understands some of the problems the Division has had to cope with paid both the committee and its chairman a high and well deserved tribute in his opening address. Our reference to the General Committee is not intended as a reflection upon it or its officers but with the feeling that the responsibilities upon it are so great that it must summon to its assistance all of the help that it can mobilize in the effort to promote the best interests of the Division, discharge its responsibilities in the biggest way, and measure up to the possibilities of the future.

An Engine Failure Defined

ENGINE failures, hot boxes, slid flat wheels and other railroad ailments of a similar nature, seem to run in epidemics. An enginehouse foreman who had been required to work considerable overtime because of an epidemic of engine failures, was asked by his wife one day what an engine failure was. Realizing the difficulties involved in making such a technical subject clear to her and also wishing to avoid having to make a lengthy explanation, he replied, "Well, an engine failure is a mighty embarrassing thing."

The Committee on Locomotive Design and Construction of the Mechanical Division included in its report, with the object of obtaining the views of the members for future consideration, a definition of an engine failure. The definition is divided into two parts. The first part states that all delays waiting at an initial terminal, caused by some defective part of the locomotive, are engine failures, and the second part states that all delays on account of the locomotive breaking down, running hot, not steaming well, or having to reduce tonnage on account of a defective locomotive causing a delay at a terminal meeting point, junction connection or delaying other traffic, are engine failures. Following the definition is a list of thirteen delays which are not to be considered as locomotive failures. Unfortunately the report was not discussed at any length but it is presumed that the thirteen provisos

or limitations were added to avoid some of the embarrassment to which the enginehouse foreman referred.

For example, one proviso states that delays due to insufficient time having been allowed in which to make needed repairs or to get the locomotive ready for the time the train is ordered to leave, when the operating department was so advised at the time the locomotive was ordered, are not to be considered as locomotive failures. Another proviso states that a delay due to the locomotive getting out of fuel or water caused by being held between fuel or water stations an unreasonable length of time will not be considered as a locomotive failure. These two provisos are cited merely to show what the committee has done towards confining engine failures to actual locomotive defects.

After all, there should be little occasion for any misunderstanding as to what an engine failure is. An engine failure should be an *engine failure* and not an operating, transportation or track department failure. It is hoped that the A. R. A. Operating Division will have its committee appointed to confer with the committee of the Mechanical Division so that a final report which will remove the perennial misunderstandings on this subject can be made next year.

Availability of the Steam Locomotive

THE Committee on Electric Rolling Stock of the Mechanical Division in its report this year has put on paper the most commonsense discussion of the relative merits and the differing characteristics of steam and electric motive power which has come to our notice. Aside from a fair statement of the facts with respect to the service of the two classes of motive power as they exist at the present time, the report is full of passages which are a challenge to those who believe that the possibilities of the steam locomotive are far from exhausted. Indeed, some of the very reasons which the committee gives to account for the characteristically high percentage of serviceable time of electric locomotives present a striking picture of the weaknesses in our steam locomotive policy, which in most cases are no more inherently necessary with steam than with electric motive power.

The following passage is taken from the introduction to the report (the italics are ours): "Whereas the simple type of steam locomotive, as used some twenty-five years ago, was available for service approximately 75 per cent of the time, the modern steam locomotive seldom produces an average greater than 45 per cent. While obviously the addition of appurtenances and refinements, all of which improve the operating performance of the unit, will increase the amount of attention necessary to keep the locomotive in running order, yet, the decrease in service rendered cannot all be charged against such refinements. *It would seem likely that a large percentage may be due to neglect in providing shop and terminal facilities in keeping with the requirements of the improved and larger power.*"

Here is another: "Test locomotives have been built and successfully operated, under favorable conditions, whereby, through the utilization of stationary power plant practices, very high efficiencies have been obtained. However, it is quite doubtful that such types will become common, because the maintenance problem presented will greatly offset all other advantages."

Is this all inherent or is it the result of conditions sug-

gested by the following passage: "However, it should be said in passing this point that the possibilities for sustained service with steam locomotives have not yet been attained and it can be said further that were the inauguration of a group of modern engines within a certain section attended with the same engineering skill and given the same support as is done when electrification is set in operation the results obtained might prove more competitive with the electric power."

Who can say that the following is not as essentially true of steam as of electric equipment: "A well designed and operated electric locomotive or multiple unit car, if properly inspected and repaired at periodic intervals, may be run between these intervals without any attention, except such inspection as may be necessary to determine that the car or locomotive is in a safe operating condition."

These few quotations are enough to suggest that the report is not one of interest to the user of electric power only. Every user of steam locomotives should read it carefully, with a mind alert to catch its full significance with respect to his own responsibilities.

Standardizing Invoices

THREE has been considerable discussion lately over the question of a standard invoice on the railroads. The proposal in general is that the railroads adopt a so-called national standard invoice which has been prepared for the use of supply concerns in rendering bills on all manner of purchases. This invoice has been approved by the Purchases and Stores division, of the American Railway Association and by the Railway Accounting Officers Association and has already been adopted by a number of railroads. It appears, however, that some roads are still undecided in their action, while others are definitely disinclined to fall in line.

The question of invoice forms is neither new nor unimportant on the railroads. During 1924 the railroads spent more than two billion dollars for materials and supplies other than fuel. The expenditures of a number of individual roads exceeded fifty million dollars. Every dollar of those expenditures was billed against the railroads on some kind of an invoice. With single roads acquiring their supplies from as many as 1,500 firms and with approximately 179 Class I railroads alone in this country, each dealing with a list of supply houses somewhat at variance with the others, the aggregate number of firms interested over the country is large.

Without some effort towards standardization every one of these firms would have its special invoice. This might prove satisfactory to the supply house, but not so to the railroads, many of which receive 4,000 or more invoices a month. In some instances these invoices are received in quadruplicate, but however received, every invoice passes through many hands before the entire transaction is closed. They are repeatedly handled by several employees in the purchasing department, they are checked by the stores organization, in the accounting department and elsewhere. Confusion from this condition and the possibilities for mistakes, where the bulk of the invoices are of different sizes and prepared in different ways, is unavoidable.

It was once thought that the solution of the problem was in the railroads developing their own invoices and furnishing supply houses with them. This is the practice on many railroads today. As a result, there are a variety of standard invoices. But, as disclosed in an article published elsewhere in this issue, this practice has not altogether solved the difficulty. In large part its

effect has been merely to transfer the confusion from the railroads to the supply houses. The cost of this confusion, in part, finds its way back to the railroads. In addition, that railroad is put to an added expense which provides the supply houses with its own design of invoice. There is also the increased cost of producing forms which are so dissimilar in character from forms of other consumers as to increase the printing costs, and unless these forms are furnished to every supply house, large and small, preliminary to placing orders, the railroad continues to receive bills on other than its standard invoices. There is justification, therefore, for further effort in standardizing invoices for railroad use.

A strong objection which has been raised against the adoption of a universal standard, aside from absence thus far of a general agreement as to the number of duplicates to be provided, is the doubt as to the protection afforded against fraud. It does not appear, however, that the general adoption of the national standard form is open to this objection. While experience has shown the enhanced possibility of collusion in the production of fraudulent invoices where the seller's name is not indelibly affixed to the invoice, but instead is attached merely by writing or typing, as where standard forms are furnished supply concerns by the railroads, this condition is met by requiring the vendors to provide invoices of the standard form on which their names have been printed.

There appears to be no important reason why all railroads should not seriously consider adopting the one form of invoice. Whether or not standardization can be commended along some lines it would appear to be the proper tendency as applied to railroad invoices. Particularly now that a standard has been agreed upon by the two railway associations, which can be used by supply houses for other concerns, it would seem to be a forward looking policy for every railroad to make the recommendation of the association effective.

A Reactionary Union Leader

IT has so long been ordinary parlance for any action favored by labor unions to be called "progressive" and any action opposed by them to be called "reactionary" that perhaps it might be well to look into this usage and see whether there is any justification for it. What is progress in industrial relations, anyway? Certainly, from the human point of view, it is action which will result in ameliorating the condition of the working man. Reaction on the other hand is a return to a bygone day; and, since human relationships never remain stationary, but must move in either one direction or another, satisfaction with the *status quo* and an effort to maintain it intact may also be termed reactionary. Now in recent years many railroads have extended various privileges to their employees regardless of their union affiliations, aiding them to save their money and purchase stock on the installment plan; providing insurance for them at low cost or without cost; providing pensions; aiding in establishing recreational facilities and fostering social and athletic activities.

Under ordinary rules of logic, from the employees' point of view, all these changes are in the direction of progress and anyone opposed to them who himself has nothing better to offer can truly be called a reactionary. Very well then, President D. B. Robertson of the Brotherhood of Locomotive Firemen and Enginemen is a reactionary. At the opening of the convention of his union in Detroit recently he urged the membership to have nothing to do with these activities on the part of

the railroads, charging that they are designed "to separate the worker from the labor organization of his craft." In other words, the railroads should not be allowed to improve the conditions of their employees except in such ways as he demands. Is Mr. Robertson interested primarily in actual improvement as such for the members of his union or is he interested primarily in making them think that improvement can come only through his initiative?

The opportunities which the railroads are giving their employees which Mr. Robertson inveighs against—recreation, free insurance, aids to thrift—are in fields where the unions cannot serve, or at least have made little attempt to do so. The railroads thus have usurped none of the unions' prerogatives. And if they had anyone ought to realize that the way to meet competition is not by invective against the competitor but by meeting his offer. And what is offered?—the same old point of view, the same old tactics of denunciation and a reliance upon skill in bargaining with the management as the only means of improving the position of the membership. A few labor leaders have indicated a growing belief that the future strength of their organizations will depend more upon co-operation with management for the good of the industry than by constant denunciation of it. Apparently, however, the idea travels with painful slowness. Meanwhile the next time we hear some railroad executive denounced as a reactionary, let us remember that many of the denouncers themselves can more accurately be so described.

Tonnage of Agricultural Traffic

MORE tons of freight classed as "products of agriculture" were transported by the railroads of the United States last year than in any previous year in their history and more "animals and products" were carried than in any previous year except 1923, according to statistics analyzing the railroad freight traffic for the past five years just issued by the Interstate Commerce Commission, in spite of the fact that the total freight traffic of the railroads in 1924 was less than that of the years 1923 or 1920.

These facts are of considerable interest, in view of the preamble of the Hoch-Smith resolution, passed by the last Congress, under which the commission is now conducting a general investigation of the railroad rate structure, in which Congress declares it to be "the true policy in rate-making to be pursued by the Interstate Commerce Commission in adjusting freight rates, that the conditions which at any given time prevail in our several industries should be considered in so far as it is legally possible to do so, to the end that commodities may freely move." The commission's statistics, showing that 116,579,252 tons of products of agriculture were originated on Class I roads in 1924, as compared with 109,317,655 tons in 1923, 111,787,032 tons in 1922, 114,068,706 tons in 1921 and 110,839,554 tons in 1920, do not seem to indicate that the present rate structure has in any way prevented the movement of agricultural products, although it is common knowledge that the resolution was originated in an idea of trying, or at least of pretending to try, to help the farmer at the expense of others. The tonnage of animals and products in 1924 was 27,749,108, as compared with 28,254,446 tons in 1923 and 26,594,856 in 1920. The total originating tonnage for 1924 was 1,188,156,661, as compared with 1,279,030,222 in 1923 and 1,255,420,991 in 1920.

Yet the Hoch-Smith resolution, although not passed by Congress until January, 1925, still contains the language:

"In view of the existing depression in agriculture, the commission is hereby directed to effect with the least practicable delay such lawful changes in the rate structure of the country as will promote the freedom of movement by common carriers of the products of agriculture affected by that depression, including livestock, at the lowest possible lawful rates compatible with the maintenance of adequate transportation service."

Of course, since Congress has directed it to do so it is incumbent upon the commission to make the thorough investigation of the rate structure which the resolution directs, and to make such changes as may be found necessary "to correct any defects so found to exist," but it hardly seems necessary to do anything to the rates on agricultural products in general to promote their freedom of movement.

New Interchange Rule No. 44

THE fact that the railroads still have in service many freight cars with wooden underframe construction, combined with the questionable practice of keeping in service freight cars that are in an advanced state of deterioration has embroiled the railroads in long and bitter disputes as to who is responsible for the failure of such cars under ordinary handling conditions. The Arbitration Committee of the Mechanical Division is called upon to make a final decision in such disputes but is often prevented from correctly placing the responsibility for the damage owing to the impossibility of determining the actual circumstances under which the failure occurs in such cases. As a result of these conditions the handling line is often held responsible for damage to cars which should have been charged against the owner. Recognizing the fact that the handling line is entitled to a greater measure of protection than is afforded under the present rule, this year's report of the Arbitration Committee contains a new rule, No. 44, which definitely points out seven different classes of car failures under ordinary handling which require the handling line to furnish a statement, after a thorough investigation, in order definitely to establish the responsibility of the car owner for the repairs. The committee is to be commended for the inclusion of this new rule in its report as it will not only protect the handling line in the case of failures of badly deteriorated cars but will tend to reduce to a minimum the practice of keeping in service freight cars that are liable to failure under ordinary conditions.

The new rule also provides additional protection to car owners in cases where equipment, in good condition, is damaged in service but cannot be attributed to the provisions of Rule 32. The decisions of the Arbitration Committee have proved many times that it has been bound by the provisions of Rule 32 to charge the car owner with damage to cars which evidence undoubtedly indicated were damaged through too rough usage on the handling lines. Under the new rule if a car, in good condition, fails in any of the ways listed it will be a clear indication that the car has been subjected to unfair usage and the handling line should be held responsible regardless of the fact that car was not derailed, cornered, side swiped or in a collision.

As a whole, the new rule provides protection for the handling line when passing over its road equipment in a decayed condition and also affords protection to the car owner against being held responsible for damage occurring to its equipment which is in good condition. It should do much to eliminate the constant controversy involved in the interpretation of Rule 32.

A Suggestion Worth Considering

ARAILWAY is an industry with a continuous cycle of operation. Its trains move constantly throughout the 24 hours of the day, seven days in the week. It is only in this way that the public can be given the expeditious service that it demands and the maximum use be secured of tracks and equipment. There is one important class of railway facilities, however, which is still operated on a single shift. This is the local freight station. In the smaller cities this plan is still adequate to meet the demands of the public and provides the most economical operation. In the larger cities, however, the advisability of operating at least certain freight stations during the night is beginning to warrant serious consideration from several standpoints.

In the first place, a freight station must, of necessity, be located close to the warehouses and other industries which it serves. This brings it into an area of congestion and high land values—so high that the fixed charges for interest on land and buildings alone frequently exceed a dollar per ton of freight handled, to which must be added all costs of handling in or out. Furthermore, most of these houses are now operating beyond their economical capacity because of the cost—if not the impossibility—of securing land for expansion. This inflicts a still further tax on what in many instances is an already unprofitable business.

One shift operation also requires the patrons of the railways to truck their freight to and from the stations across city streets during the busiest period of the day, adding materially to the congestion which has become so great in many cities as to approach the point of absolute blockade. This congestion on the streets and also at the freighthouses materially increases the shipper's cost of delivery to the freight station.

Obviously the easiest way in which to reduce the investment cost per ton of traffic handled is to increase the amount of traffic handled by means of that investment. This can be done most readily by increasing the number of hours that investment is employed or, in other words, by adding a night shift. Such an arrangement would enable many of the larger shippers to transport their freight to and from the freighthouses during the night when the streets are largely, if not entirely, deserted, thereby eliminating delays on the streets and at the freighthouses and greatly increasing the amount of work which they can secure from their trucks. It would also enable many of these concerns to eliminate the interference with their shipping and receiving operations which now exist. From the standpoint of the railways, all tonnage which can be passed through the house during the night will reduce the load on the following day to that extent, thereby not only increasing the capacity of the house, but reducing the cost insofar as it is increased by the congestion which now prevails.

The principal objection to this plan is the fact that it will disarrange many of the merchandise schedules now in effect, not a few of which are highly competitive as between roads. However, as between the more important cities several cars are now commonly loaded daily and where full loads would not be secured at night, these cars could be resotted for day loading. In fact, if the plan offered no advantage other than the resultant increase in the capacity of the house itself and the cars spotted during the early evening were left for further loading during the following day, it would still appear to have merit and in those cases where full cars are

loaded they could be started on their way 12 hours earlier than under the arrangement now prevailing.

The cost of handling less than car load freight is rising out of all proportions to the revenue produced and this cost will continue to rise as land values increase and congestion becomes greater. Other industries are solving this problem by night operation. The railways themselves follow this method in train service. It would, therefore, appear to be a logical step for them to consider the extension of 24-hour service or of 16-hour service to their freight stations in the larger cities.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Poor's Feature Volume, 1925: Government, State and Municipal Securities. State and other issues in aid of railroads discussed in the debt histories of each state. 997 p. Pub. by Poor's Publishing Co., New York City.

Transportation in the New York Region, by Wm. J. Wilgus. Paper before International City Planning Conference, April, 1925. 30 p. Publisher not given, but probably available from author, New York City.

Periodical Articles

Fair Play for Railways, by E. T. Good. Public attitude towards British railroads. *Financial Review of Reviews*, April-June, 1925, p. 12-19.

The Motive Power of the Lehigh Valley Railroad, by Paul T. Warner. An illustrated historical sketch. *Baldwin Locomotives*, June, 1925, p. 2-21.

A Note on the Evolution of Locomotive Types, by Lawford H. Fry. "The attempt here is to note in due order the causes leading to the emergence and permanence of the various locomotive types." *Baldwin Locomotives*, June, 1925, p. 25-33.

The Proposed Loree Railroad Merger Analyzed. Traffic and geographical features by Charles W. Foss. Income, debt and security items by A. Motelle, *Annalist*, June 15, 1925, p. 804-807.

Work of the Canadian Railway Troops in the Great War, 1914-1919, by Lt. Col. A. C. Garner. Outline of organization and accomplishments. *Engineering Journal (Canada)*, June, 1925, p. 249-253.

New Books

Gedenkboek der Staatspoor-en Tramwegen in Nederlandsch-Indië. 1875-1925, by S. A. Reitsma. 216 pages. Illustrated. Maps, Charts. 9½ in. x 12¾ in. Paper covers. Published by Office of Chief Inspector, Railways and Tramways, Netherlands Indies, Batavia, Java.

This handsome work, issued in connection with the fiftieth anniversary of the railways and tramways of the Netherlands Indies, is a comprehensive history of improved transportation in the islands comprising the Dutch East Indies. The many full-page illustrations and maps enable even one who is unfamiliar with the Dutch language to obtain more than a casual idea of railroad construction and operation in Java, Sumatra, Borneo, and the other islands. No detail has been overlooked apparently in preparing this account of the extension of this transportation system and its improvement.

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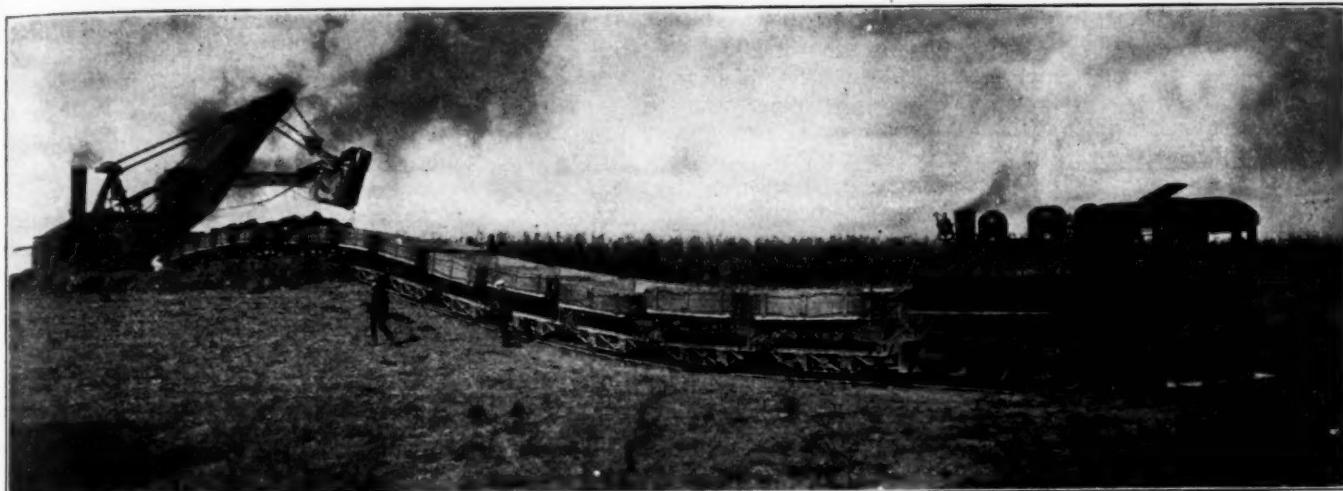
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Steam Shovel Finishing the First Cut in Diversion of Silver Creek

Michigan Central Yard at Toledo Expedites Interchange

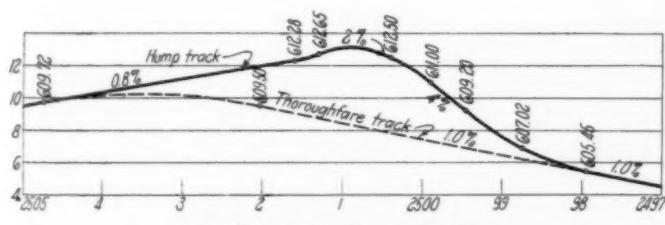
New classification terminal eliminates congestion at gateway in movement of northbound coal business

By E. R. Lewis

Principal Assistant Engineer, Michigan Central, Detroit, Mich.

THE construction of an ample classification yard at Toledo, Ohio, is in line with the Michigan Central's general policy of expansion of terminal facilities for the efficient handling of an increasing traffic. Toledo, however, is peculiarly important as a gateway for northbound coal. The Toledo switching district has been the scene of more than one midwinter period of acute freight congestion directly traceable to inadequate terminals for handling the peak of the coal traffic offered the railroads during the season of closed navigation on the

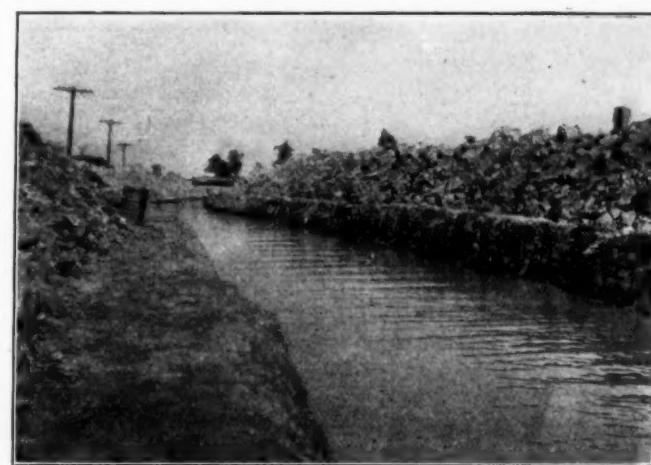
yard tracks will accommodate from 60 to 70 cars, while the classification yard tracks will hold from 47 to 130 cars each and the total capacity of the repair yard is 130 cars. The approach grade to the hump rises at the rate of 0.8 ft. per 100 ft., which rate is doubled in the last car length. From the summit northward the grade falls at the rate of 2 per cent for the first 50 ft., 3½ per cent for the next 150



Details of the Hump Profile

Great Lakes. In consequence of these experiences, the northbound unit of the Michigan Central freight yard received first attention, was constructed with a view to placing the major portion in operation December 1, 1923, if necessary, and was first operated in its entirety September 15, 1924.

The total capacity of the unit is 4,000 cars. It has 10 receiving tracks and 34 classification tracks, as well as the usual subsidiary trackage, including a run-around track, a five-track car repair yard, a way-car track, a 4,200-ft. trolley track for a hump rider's gasoline car, etc. Receiving

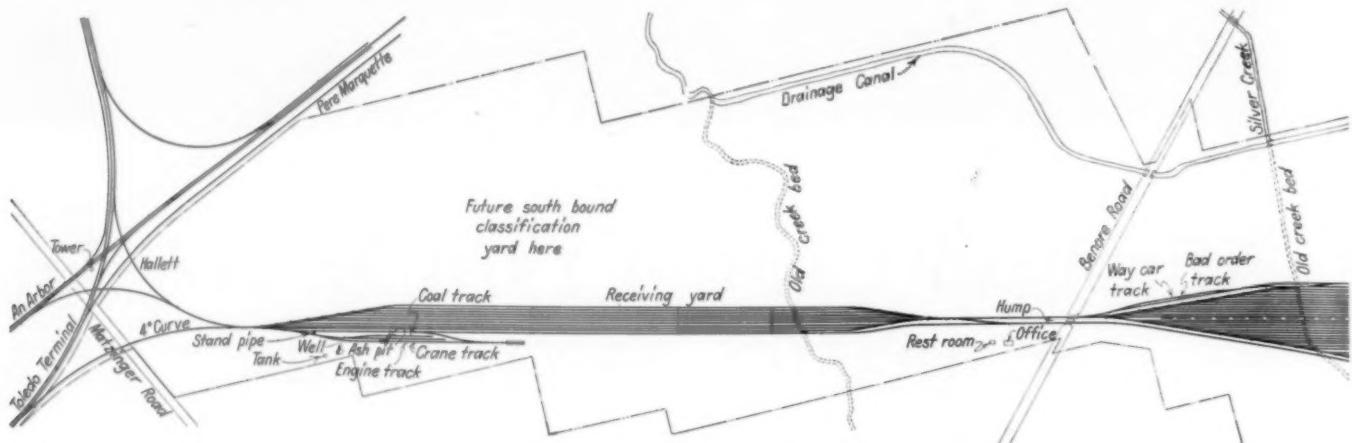


A Canal Was Dredged to Divert the Water of Several Creeks

ft., 1 per cent thence through the ladder tracks and 0.5 per cent for two-thirds the length of the yard, as shown on the profile. The construction involved the moving of 1,300,000 cu. yd. of earth and the laying of 45 miles of track.

The operation of these facilities obviates the necessity of the former practice of rehandling in Detroit all of the unclassified freight received from Toledo for Detroit and points east, west and north. The flat switching yard at North Toledo, through which freight for all destinations was formerly handled, will now be used only for southbound traffic, until such time as a southbound unit is added to the new northbound yard, the peculiar location of which may be best understood by examining the map showing the relative positions of the various railroads entering Toledo. Hallett, Ohio, at the south end of the new Michigan Central yard is three miles south of the north yard lead

a mile wide by three miles long, is situated some three miles from the westerly end of Lake Erie and is crossed by a considerable creek and two parallel tributaries as well as by three public highways. The drainage and roadway problems were complicated because of the interstate feature and their solutions were required in advance of construction because of the nature of the subsoil and the time limit imposed. To drain the whole tract effectively as well as to avoid the comparatively great expense of building two concrete culverts across the entire property to carry Shantois creek and Silver creek under the yard tracks, a canal was excavated close inside the westerly



Receiving End of the New Yard

switch at Stearns road in Michigan. Hallett designates an interlocker safeguarding the crossing and connecting tracks of the Ann Arbor, the Pere Marquette and the Toledo Terminal Railroad as well as the south lead tracks of the new Michigan Central yard, which provide access to tracks of the other three roads.

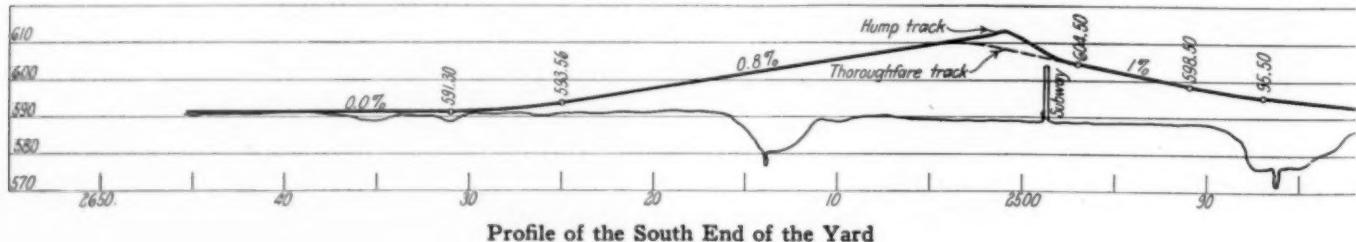
Direct Connection with Toledo Terminal

The Toledo Terminal Railroad is a belt line encircling the city which is owned by the New York Central, the Michigan Central, the Toledo & Ohio Central, the Balti-

boundary and northward from Shantois creek to intercept Silver creek and carry the water of both streams into Halfway creek near the north end of the yard.

Dredge New Channel

Halfway creek is here an estuary of Lake Erie with a widening marshy spread of shallow water, the stream bed being below the surface of the lake. The narrow winding channel in this marsh was changed by dredging a deeper channel close to the northerly bank where the stream, thus diverted by means of an embankment built



Profile of the South End of the Yard

more & Ohio, the Pennsylvania, the Pere Marquette, the Hocking Valley, the Grand Trunk and the Toledo Shore Line. It serves as a means of interchange among the railroads as well as an available route to the tracks serving the principal industries located in Toledo and vicinity. On account of the service thus afforded, the leads to the receiving yard of the Michigan Central have been arranged to obtain the most convenient access to the Toledo Terminal yard near Hallett, disregarding any southerly connection with the Michigan Central main tracks which diverge westerly, crossing Matzinger road about one mile west of Hallett.

The land provided for this project included 475 acres of flat, highly cultivated ground comprising a number of small fruit farms, vineyards, etc. This tract, roughly half

across the natural course, crosses only two lead tracks whereas the old channel would have crossed several tracks in the classification yard. This canal was built under agreement with the authorities of Lucas country, Ohio, and Erie county, Mich., to carry away all flood water from this drainage area, including the spring flood water of 1924. The earth moved, amounting to 160,000 cu. yd., was about one-third wet blue clay, a portion of which was wasted. The top seven feet of excavation was yellow clay which was handled largely in dump car trains, the remainder being hauled into embankment in three-horse dump car wagons loaded by means of Western grading machines operated by caterpillar tractors of 20 hp. each. The plastic blue clay below this level was excavated with steam shovels and with cranes equipped with clam shells,

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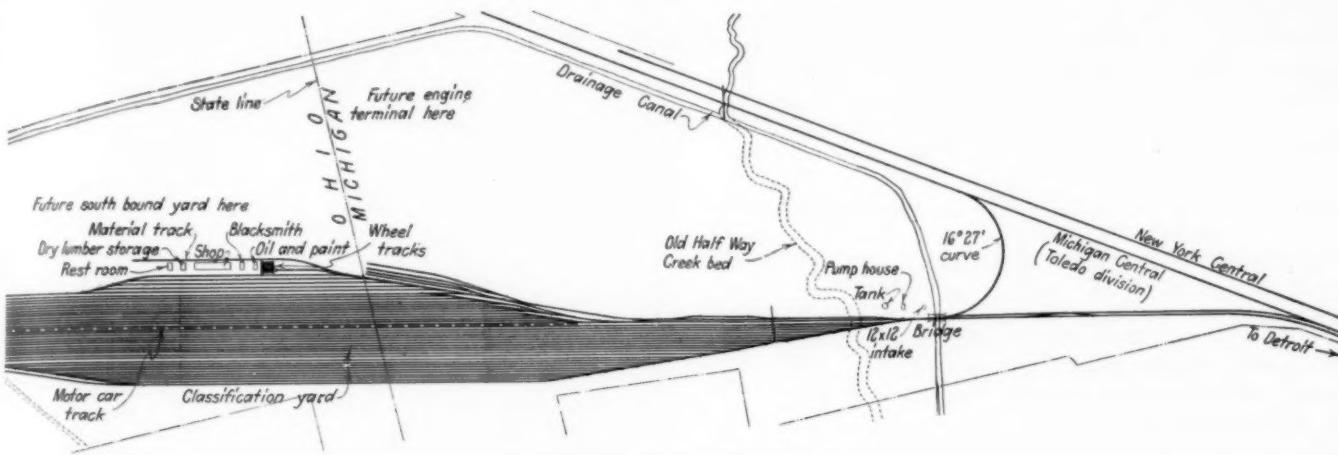
orange-peel buckets and drag-line buckets as best suited the varying character of the material, much of which had to be moved in freezing weather.

The upper half mile of the canal has a base width of 15 ft. with $1\frac{1}{2}$ to 1 side slopes and an average depth of 14 ft., while the lower mile with the same depth and slopes is 25 ft. wide on the bottom. Two outlets into Halfway creek were provided to drain the entire swamp west of the yard adequately into the channel dredged beneath the double-track lead.

Because of short span bridges down stream, no scow dredge could be employed readily, so the channel through

for the foundations for concrete floors of buildings, etc.

Owing to the difficulty of handling clay and the scarcity of material suitable for finishing embankments and for sub-ballast, a sandpit was opened above five miles from the yard. While the bulk of the embankment was made of clay excavated from the yard property, some 140,000 cu. yd. of sand was hauled in by train to form the top of the prism and to finish the roadbed. The equipment employed in the sand service included a railroad type steam shovel with a three-yard dipped loading standard-gage, 20-yd. side-dump cars from sidings off the Detroit, Toledo & Ironton main track whence trains traversed that

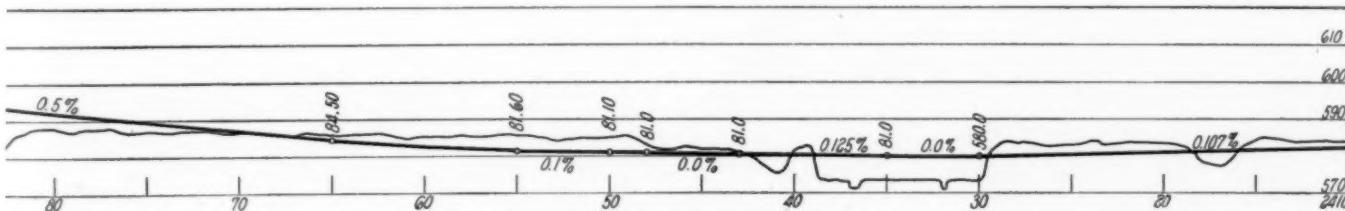


Departure End of the New Yard

the swamp was made with a land dredge moved on timber stringers during periods when water in the lake was low due largely to the prevailing westerly winds. While the normal stage of water in Lake Erie in recent years has been approximately 572 ft. above mean sea level, it has varied as much as three feet between the high level reached in July and the low level of the following March. Quite aside from these seasonal variations, the water levels at opposite ends of the lake fluctuate as much as eight feet under the influence of wind storms. Provision of drainage and water supply in this territory require close considera-

road and the Toledo Terminal railroad to the south end of the yard. This material was supplemented with foundry sand, slag and other industrial refuse.

The contractors used about 100 teams and dump wagons working in conjunction with tractor-drawn Western road grading machines to form the embankment base from borrow pits which were so broad and well finished as to present the appearance of the original ground scraped free of top soil, lightly harrowed and perfectly drained. A narrow-gage outfit of 200 seven-yard side dump cars and several small steam locomotives delivered clay from



Profile of the North End of the Yard

tion of these fluctuations, the worst flood conditions occurring during severe easterly rain and wind storms in early spring, while difficulties with water supplies from the lake occur when the lake level is low on account of westerly winds, usually in the late summer months. By continuing the canal excavation throughout the winter of 1923 and 1924 a waterway was formed sufficient to carry the spring floods of 1924 and the cut was completed before midsummer. Because of the heaviness of the yellow clay soil, over which it is impossible to move loads and difficult even to walk on during wet weather, a thorough system of cross drainage and of cinder roadways was installed as early as possible, cinders being drawn from all available sources during the entire period of construction. This material was used also for ballast for all tracks and

excavations made with locomotive-type steam shovels on the north portion of the yard property to a dumping trestle built to the height of 25 ft., and subsequently widened the fill as required. The material was nearly all moved during August, September and October while track work in the receiving yard was prosecuted as rapidly as the roadbed was built.

The speed with which the caterpillar-drawn road grading machines were operated greatly expedited the work. Another important factor for increasing efficiency was the maintenance of construction camps, affording good food and sleeping accommodations. The labor turnover was almost negligible, only two shipments of laborers being made. Most of the common and much of the skilled labor was obtained locally, at wages equal to or even

less than the prevailing average rates. Equally good results were obtained from the expert handling of the mule outfit employed in connection with the dump wagon and scraper service.

Track Standards

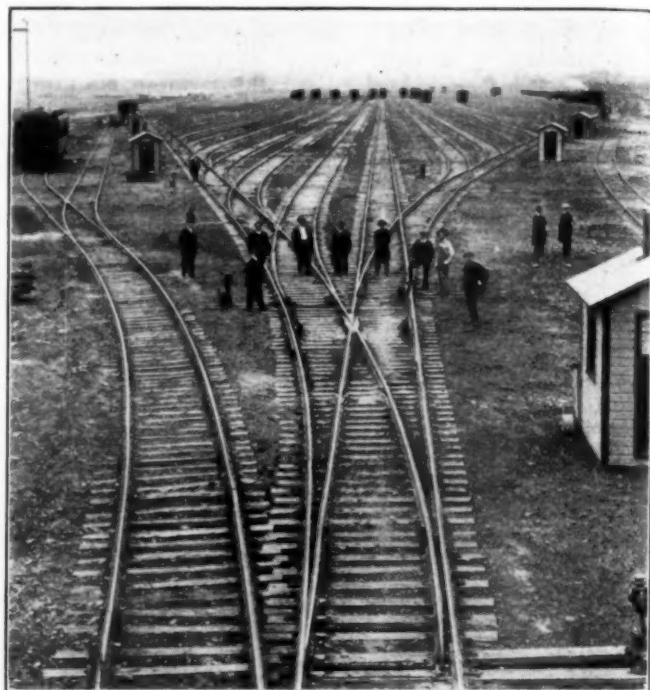
The 45 miles of yard tracks are laid with rerolled 100-lb. A. S. C. E. rail, 25-in. four-hole angle bars, untreated white-oak ties, 7 in. by 10 in. tie plates and Henggi anti-creepers. The 140 turnouts are equipped with No. 9 rigid rail-bound manganese frogs and 15-ft. switches, one-piece manganese guard rails and hand-operated low Ramapo switch stands.

The highways crossing the property were disposed of in various ways in accord with agreements with public authorities. Matzinger road, a paved country highway intersected by two lead tracks, at Hallett, is crossed at grade. Benore road, a highway of the same class was placed in a subway 150 ft. north of the summit of the hump comprising an overhead, double track, reinforced concrete bridge with I-beam floor, carrying the lead and thoroughfare tracks entering the classification yard. The same highway is carried over the drainage canal on a reinforced concrete bridge of 26-ft. span. Halfway road, which crossed land now occupied by the classification yard tracks, was diverted north over a 150-ft. concrete bridge spanning Halfway creek at the easterly property boundary. Cinder driveway were constructed throughout the length of the yard, with parking spaces around the buildings. In addition to the highway bridges, the double-track north yard lead is carried over Halfway creek on two reinforced concrete structures, each consisting of three 25-ft. spans with waterproofed ballast floors on I-beam decks.

A group of carshop buildings, bad order transfer facilities, scales, etc., were installed on the west side of the classification yard in proximity with the repair tracks. Various office buildings were erected at and near the hump, including trainmaster's and yardmaster's offices, car checkers' office, hump riders' shelter, switchmen's shelters, etc. Yard offices also were erected at the receiving yard. All of these structures are temporary frame buildings on concrete floors and foundations. It is proposed to build

and one-stall shed enclosing an inspection pit and track. The installation includes:

- 1 car repair shop 35 ft. by 192 ft.
- 1 lumber house 30 ft. by 42 ft.
- 1 blacksmith shop 20 ft. by 40 ft.
- 1 paint shop 20 ft. by 40 ft.



The Fan of the Classification Tracks as Seen from the Hump

- 1 rest room 20 ft. by 40 ft.
- 1 canopy shear shed
- 1 stores platform
- 1 wheel turntable with depressed track

The machinery installed includes:

- 1 hollow chisel car mortiser
- 1 36-in. sliding head drill press
- 2 dry grinders



Loading Three-Horse Wagons from a Borrow Pit

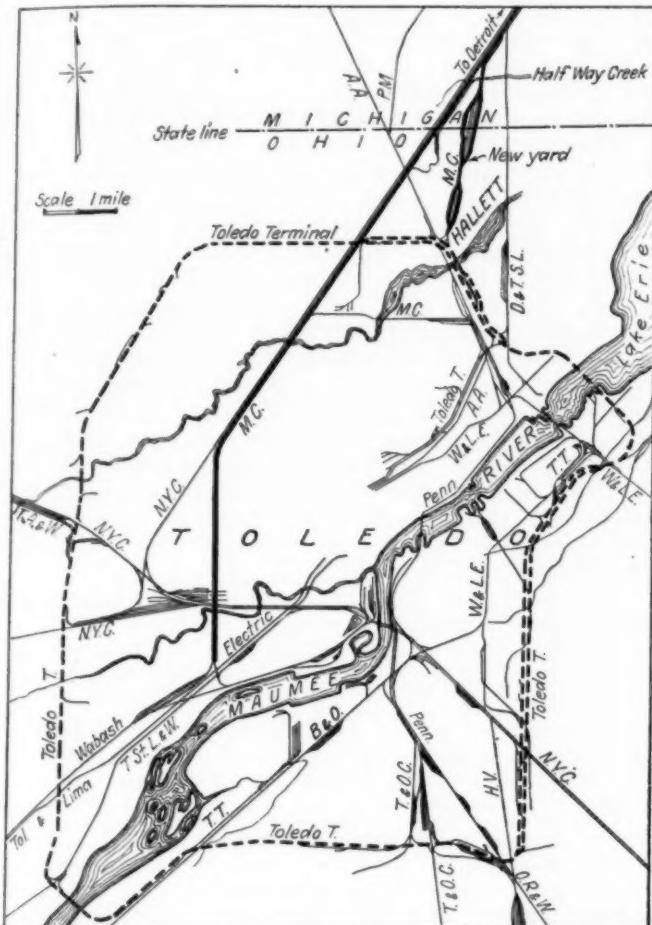
permanent groups of buildings including a locomotive terminal complete in connection with the construction of the southbound unit at some future date.

Temporary locomotive facilities built on the east side of the receiving yard include a cinder pit and water column

- 1 double end girder
- 1 automatic cut-off saw
- 1 36-in. heavy rip saw
- 1 triple valve test rack
- 1 band scroll saw
- 1 pneumatic flanging clamp

1 single end punch, 36-in. throat.
1 No. 26 power slitting shear.
2 air compressors and reservoirs

All machines derive power from a company-owned power line extending north from Hallett where electric energy is obtained at 4,000 volts from the Toledo Edison Company and stepped down by transformers. Electricity from this source is used also for flood lights and light signals, for pumping water for locomotive use, for lighting buildings, etc. Telephone lines have been installed, connecting all office buildings throughout the yard, while con-



The New Yard in Its Relation to the Toledo Terminals

nnection is also established with the southbound yard and the tower at Hallett. The property has been enclosed with 48-in. woven wire fencing supported by Jackson T-iron line posts with 100-lb. rails set in concrete for corner and straining posts.

Water Supply from Lake

The ground water in this vicinity, while acceptable for drinking purpose, is heavily impregnated with magnesium sulphate and therefore unsuitable for boiler use. It was evident that Lake Erie was the logical source of water supply for locomotives and while the yard is some three miles or more from deep water in the lake, it proved feasible to obtain a practically inexhaustible supply of lake water from the Halfway creek estuary at the point of crossing of the north lead of the classification yard tracks. For this purpose a tile and concrete pump house was erected on the south bank of the waterway, a concrete intake was constructed adjacent to the dredged channel and a 50,000-gal. storage tank with water column provided with a view to using lake water untreated, through the

agency of an automatic, electrically driven pump. This supply will eventually be piped throughout the yard to furnish both units. In the same pumphouse the Pere Marquette has installed pumping facilities for its Erie yard, connected therewith by a 10-in. pipe line some 2.3 miles in length. No perceptible difference in the water level of Halfway creek is noted with all facilities pumping.

The Ferguson & Edmondson Company, Pittsburgh, Pa., was the general contractor and carried through all the construction excepting the bridges and buildings which were built by the Newhall Company of Cleveland, Ohio. The design and general plans were the work of W. D. Elder, assistant engineer, and the project was carried to completion under the jurisdiction of the J. F. Deimling, chief engineer, Michigan Central, Detroit, Mich., and the writer, H. J. Payne being engineer in direct charge of construction.

New Haven Forms a Company to Operate Buses

THE New York, New Haven & Hartford announces that incorporation papers have been filed at Boston looking to the establishment of the New England Transportation Company which has been incorporated for the purpose of owning, maintaining and operating motor vehicles for the transportation of passengers, baggage, freight, mail and express on the highways in Massachusetts, Rhode Island, Connecticut and New York, both in interstate and intrastate commerce; authorized capital \$1,000,000.

The directors of the company are Francis C. Coley of New Haven, Conn. (passenger traffic manager of the railroad), Frank A. Farnham of Brookline, Mass., James O. Halliday of Brookline (superintendent of transportation), Eugene J. Phillips of Providence, R. I., Arthur P. Russell of Hingham, Mass. (vice president of the road), and Benjamin I. Spock of New Haven (general counsel).

The officers of the company are Arthur P. Russell, president; Eugene J. Phillips, vice-president; Charles A. Knights, treasurer; E. C. Parker, clerk; Arthur E. Clark, assistant clerk, and R. H. Palmer, auditor. Frank S. Hobbs, recently superintendent of the Midland Division of the New Haven, has been appointed manager of the new transportation company in charge of operation.

The railroad company in its announcement reviews the events of the past few years, in developing new methods of transportation and recognizes their permanent character. The territory which the company serves will always be dependent for the bulk of its heavy transportation upon railroads and, pending further development, the company quotes, "in order to serve the public and protect its own invested capital, must utilize to the greatest extent its own railroad and give, so far as practicable, adequate transportation service over the same." Continuing, the statement says:

"Passenger service on some lines can no longer be operated with steam locomotives except at a large loss, and so the company has been a pioneer in experiments looking to a less expensive method of operation. To this end it has co-operated with the manufacturers of gasoline rail cars and has substituted such cars for certain of its passenger trains for the continuation of service which, because of light travel, could only be provided for by less expensive methods of transportation."

"It now has in operation 25 of these gasoline rail cars and proposes to continue to develop this kind of operation."

The car of last design is run by a gas engine with electric transmission and motor, permitting operation from either end without turning. This car has a capacity of 65 passengers and is the largest that has been used for this purpose. The company is arranging to buy a number of additional cars of this design, with some increase in power and capacity.

"The company finds that there are some portions of its system which cannot be operated economically even by gasoline cars for passenger service, with the frequency of service desired by the public. Where such conditions exist, it is the intention of the company, so far as possible, to continue to give freight service and such passenger train or gas rail car service as may be required, and to operate over parallel highways with buses.

"There are still other points on its rails between which transportation has been heretofore performed by routes that are now circuitous, compared with the distances over the recently constructed highways. It is the company's plan to consider highway bus service between certain of such points and to so handle the travel which originally used the rail.

"This policy of the company is to be inaugurated and carried out with the intention of furnishing an adequate passenger service in connection with its rail lines; to give to the public the accommodation which the demands of its patrons require and to use that mode of transportation which is the most efficient, economical and best adapted to the performance of good service."

The subsidiary company will make the arrangements for plant and equipment, routes and service will be developed and the approval of the state commissions will be sought.

I. C. C. Organizes for Rate Investigation

WASHINGTON, D. C.

FOR the purpose of conducting the rate structure investigation, No. 17,000, directed by Congress in the Hoch-Smith resolution, the Interstate Commerce Commission has instituted Division No. 6, composed of Commissioners McChord, Aitchison (ex officio), Hall, Eastman and Campbell, and in addition it has appointed a committee of its traffic and statistical employees including W. V. Hardie, director of the Bureau of Traffic, M. O. Lorenz, director of the Bureau of Statistics, and Examiners W. N. Brown, Ulysses Butler, F. H. Barclay, W. H. Wagner, John B. Keeler and E. L. Beach. The National Association of Railway & Utilities Commissioners had also appointed a co-operating committee composed of nine rate experts of the state commissions, of which P. E. Fichenscher of the Pennsylvania commission, O. O. Calderhead of the Washington commission, J. H. Alldredge of the Alabama commission, and U. G. Powell of the Arkansas commission have been designated as a subcommittee. It is expected that the co-operating committee or the subcommittee will be called to Washington to consider, with the commission's committee, the various statements as to the meaning of the resolution and the procedure that should be followed that have been filed with the commission.

Very few statements and briefs in reply to those earlier statements had been filed with the commission by June 15. The Portland Cement Association has filed such a statement in which it says the cement industry affirms that its rates bear their full proportion of the transportation burden and in view of the growing un-

certainty as to future rates it urges the commission to make an announcement at an early date.

A supplementary statement was filed on behalf of the National Grange by T. C. Atkeson, Washington representative, which says in part:

"No statement or brief which has been filed, as shown by the records of the commission up to today, June 15, 1925, the final date set by the commission for filing of answers in the Hoch-Smith freight rate structure case, makes any effort to either meet or deny the facts which are set up in the statement filed by the National Grange May 14, to the effect that in the present rate structure the rates on agricultural products generally are higher than the freight rates on the products of the agricultural industries generally and that such rates in the application of the rule of rate making set up in Public Resolution No. 46 of the 68th Congress, should be reduced.

"The statement of the National Grange that freight rates on agricultural products generally are higher than the freight rates on products of manufacturing industries generally and that this is a contributing cause to the conceded depression in agriculture was substantiated by quotations and references to the report of the Joint Commission of Agriculture Inquiry whose findings on this subject have never been questioned, and by quotation from actual official records showing that more than 6 per cent of the total income of agriculture was paid in transporting about one-half of its products to market, while only about 2 per cent of the total income of manufacturing was paid for transporting more than 90 per cent of its products, and that the railroads charged \$670,000,000 for carrying 220 million tons of agricultural products, or \$3.49 a ton and only \$2.54 a ton for carrying manufactured articles.

"The more important briefs which have been filed fall into four general classes:

"1. Briefs filed by professional traffic experts and attorneys, of which that of the National Industrial Traffic League is typical. These briefs avoid the merits of the rate case and follow the usual lawyer-like procedure in cases where the facts cannot be controverted, that of 'confession and avoidance.' In general they are an effort to befog the interpretation and real purpose of Public Resolution No. 46 of the 68th Congress.

"The plain language of the Resolution, unclouded by any interested interpretation, shows the intent of Congress that the array of facts showing the unfavorable position of agriculture should be taken fully under consideration. The National Grange therefore asks for such prompt action on the part of your commission as will fulfill the plain intent of the resolution.

"2. Statements filed by representatives of the carriers. These statements in general do not make any effort to discuss the merits of the case on behalf of agriculture or other depressed industries, but are in the main arguments as to why gross freight earnings should not be reduced. Section 15a of the Transportation Act covers this.

"3. Briefs filed on behalf of special interests or special localities. These briefs in general attempt to set up allegations of discrimination which may or may not be well founded. They are entirely aside or apart from the large questions of a new national policy of rate making.

"4. Statements filed on behalf of general agricultural organizations. These statements support and supplement in a general way the arguments which were presented in the brief of the National Grange. In particular, the mass of details showing apparent discrimination and impeding of the free movement of commodities which is shown by the briefs of the various fruit and vegetable organizations are commended to the attention of the commission."

Railway Accounting Officers Meet

*Association held 37th annual meeting at Atlantic City,
N. J., on June 9 to 12*

THE Railway Accounting Officers Association held its thirty-seventh annual meeting at the Hotel Traymore, Atlantic City, N. J., on June 9 to 12. Over 300 members of the association attended. E. M. Thomas, comptroller of the Chesapeake & Ohio and president of the association, presided over the sessions. Addresses were made by Alfred P. Thom, general counsel of the Association of Railway Executives, and by Ray M. Hudson, chief of the Division of Simplified Practice of the Department of Commerce. There were in attendance at the meeting Louis Hamann, chief accountant of the New Zealand Government Railways, and G. Morton, audit assistant of the London, Midland & Scottish, both members of the association. Mr. Hamann made a brief address describing the railways of New Zealand, and Mr. Morton entertainingly answered a large number of questions concerning the differences in the accounting work and governmental requirements relating thereto in England and in America. A letter was read from Joseph B. Eastman, Interstate Commerce Commissioner, with which was submitted a memorandum prepared for Mr. Eastman by Alexander Wylie, director of the I. C. C.

Bureau of Accounts, dealing with the proposed revision of the accounting classifications still under consideration and other phases of governmental requirements.

The feature of the activity of the association that probably stood out most as far as the annual meeting was concerned, was included in the report of the Committee on Disbursement Accounting. This committee has for the past three or four years been devoting considerable effort in the attempt to work out standard methods of fuel accounting, of payroll accounting and of the reporting of time returns and labor and material distributions for the maintenance of way department. The work was completed during the past year and the findings appeared in the committee report as three of the 24 subjects considered by the committee during the year. The part of the report dealing with fuel accounting required 44 pages of the Agenda and included were 34 standard forms. No less than 51 standard forms were prepared in connection with the suggested method of payroll accounting, and the presentation of the forms and the accompanying text matter required 76 pages of the Agenda.

President's Address

The president's address by E. M. Thomas, comptroller of the Chesapeake & Ohio, reviewed the activity of the association and discussed present leading railway accounting problems. The address follows:

My period of service in this office has given me an added insight into the splendid ideals and efforts of our profession. One cannot be president of this association—the highest honor within the power of the railway accounting profession to bestow—without feeling the broadening and uplifting influence of the office, as well as the harmonious co-operative relationship existing between all of our members.

The Railway Accounting Officers' Association is the clearing house for ideas and experiences. By the investigation and reports of its committees, the free and full discussions at its meetings, the recommended practices, forms, etc., which it adopts and disseminates, the mandatory rules, which govern the transaction of business between carriers, and by the very substantial success with which all of its recommendations and rules are efficiently observed and followed, the Railway Accounting Officers' Association is exerting a potent influence for efficiency, simplification and economy.

Growth of the Association

The Association has had a remarkable growth since its establishment in 1888, during which year there were 137 members. At the end of the first ten years, the membership consisted of 344 individual members. At the end of twenty years, the number was 497, and in 1918, the number was 718, while the present membership, as of May 23, 1925, consists of 1,105 members, an increase of 54 per cent since 1918 which was the year of federal control when we had both corporate and federal officers. During the current year, there have been 122 new members admitted. This may be accepted as an indication of the Association's success and enhanced prestige. Of the 1,105 active members, there is represented in the association practically every important steam and electric railway, express company and water-line carrier in North and South America, as well as in various other parts of the world. More than one-half of the total railroad mileage of the world is represented by membership in our association. There are present at this meeting, representatives of railroads in England and New Zealand. Within the last few weeks, the

association has received an application for membership from an officers of a railroad in Mesopotamia.

Work of Committee on General Accounts

During the year, the Committee on General Accounts has given consideration to many important subjects such as the "revision of the classifications," "accounting for rebuilt equipment," "modifications of reports and statistics," "accounting under the recapture provisions of the Transportation Act of 1920," and so on. The commission is still giving consideration to the recommendations of this committee in connection with the revision of the classification of operating expenses, and is also, we understand, giving consideration to changes to be made in other classifications. This is a stupendous task, and must take a long period of time in order that the classifications which have been in effect so successfully since July 1, 1914, are properly revised to take care of present day conditions, following the upheaval during the world war and subsequent thereto, and also to comply with certain provisions of the Transportation Act of 1920, but not undo the principles of railway accounting on which these classifications have been in the past and must be founded in the future. At the same time, however, every effort should be put forth to simplify accounting practices. Our dealings are largely with the public and by their very nature are more or less complex, and while it is proper to respect a precedent we should constantly look to improvement.

Accounting for Recapture

The Committee on General Accounts has been actively engaged in the consideration of the subject of accounting under the recapture provisions of Section 15a which is subject 17 in the agenda and the report on which will be found in bulletin No. 108, a copy of which has since the printing of the agenda been sent to all members. The important features connected with recapture are:

- (a) The establishment of net railway operating income and
- (b) The determination of value of the property held for and used in the service of transportation from which values the rate of return is obtained.

It is important to the accounting officers, as well as all others concerned in the welfare of the railroads, that this problem be thoroughly understood. We have a good illustration of the use

and effect of accounting practices with respect to accruing revenues, expenses and other income items, the establishment and working out such reserves created by accruals, etc., in the recent discussion with the Interstate Commerce Commission set forth in the report of the Committee submitted to the Director of Accounts of the Commission contained in bulletin No. 108 previously referred to and which has since been sent to the members of the Association of Railway Executives.

The commission in certifying the standard returns of the railroads for the periods of federal control and guaranty periods accepted the accrual practices of the carriers and on such standard returns, settlements have been made with the director-general by all the carriers who were under federal control and a large number of carriers have made settlements with the Interstate Commerce Commission for the guaranty period. To carry out literally the order of the commission in regard to accounting of the net railway operating income for recapture will mean, in my judgment, a useless expenditure of a vast amount of money in clerical effort and not give any more nearly correct accounting than obtained prior to the period of federal control and guaranty period.

Valuation

The matter of the determination of the value of the property held for and used in the service of transportation is a subject of very great importance to the carriers and particularly to the accounting officers. The commission has been actively engaged in this work since March 1, 1913, when the valuation

the other the accounting departments, will give to the commission the practical experiences of these two associations. It is agreed that this work can be more successfully carried on by the Railway Accounting Officers' Association being the official spokesman for these associations in co-operating with the commission on all matters relating to accounts and statistics.

Committee on Freight Accounts

The Committee on Freight Accounts submits for your consideration 101 subjects. It has held an unusual number of meetings during the year, and the recommendations submitted speak for themselves. Specific attention should, however, be called to the subject submitted by the committee on freight accounts in regard to the time limit for adjustments among carriers for their accounting differences and corrections. The recommendation adopted by the association, to become effective July 1, 1925, [later changed to January 1, 1926] has been revised by your committee during the year. The revised rule was circularized to all of the interested accounting officers and a large number of replies have been received which replies express approval of the adoption by the association of such a rule as being a step in the right direction toward simplification and economy. Some carriers have found that the rule would adversely affect them, and for this reason have objected thereto. The objections of these carriers have been submitted to the committee. If the association is to have mandatory rules, and certainly we all agree that mandatory rules are essential and necessary for the strict conduct of the work between carriers,



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act was approved. Since that time, vast sums have been spent by both the government and the carriers and up to the present time comparatively few final valuations have been found. This illustrates the greatness of the task imposed upon the commission by Congress. In this work, the accounting officer should play an important part, because so much of the work is accounting for the facts in regard to the valuation of an individual property before even all the legal questions are determined by the courts.

Accounting for Rebuilt Equipment

The accounting for rebuilt equipment is a subject which concerns all the carriers and about which there has been many expressions of opinions. The importance of securing proper accounting in this regard was brought out when the carriers were called upon to pay huge sums to the federal government as a capital expenditure for what practically meant repairs to its own equipment. It is hoped that the commission will accept the recommendation made by your committee which is also published in bulletin No. 108. Its acceptance will be decidedly in the interest of simplicity and economy of accounting.

This association appreciates the opportunity it has had in the past to serve the Interstate Commerce Commission in its various undertakings, and we again wish to assure the commission that all of the machinery at its command is offered to them in whatever manner the commission may desire the association's help.

Co-operation with American Railway Association

We have, during the year, brought about an active co-operation with the American Railway Association, so that the recommendations resulting from consideration of both of these associations, one representing the operating departments of the carriers, and

it will be worth while to remember that if the association waits before the adoption of a mandatory rule until such rule would be without effect on any of the carriers, then there would be no necessity for the adoption of a mandatory rule.

The Committee on Passenger Accounts is entitled to praise for service which it has rendered throughout the year in simplifying passenger accounting, and in devising helpful methods and plans incident to passenger accounting for carriers generally.

Committee on Disbursement Accounts

During the year, the Committee on Disbursement Accounts has continued its splendid work in developing forms and practices that will bring about uniformity in disbursement accounting and be of great assistance to carriers generally. The amount of work accomplished is illustrated by the reports submitted by this committee in regard to payroll and fuel accounting. It would probably be no exaggeration to say that the payroll accounting report involved a study more comprehensive and exhaustive than was ever undertaken, under any similar circumstances, by any committee of this association. By referring to the agenda, you will note that this committee's report, including the great number of forms which have been adopted by the committee and which are submitted to you for your concurrence, covers 146 pages of the agenda.

The Overcharge Committee has prepared for your consideration a number of recommendations that will simplify and facilitate the accounting among carriers for overcharge adjustments. This committee has undertaken, and successfully handled, some very important matters of this nature.

The report of the Committee on Terminal Companies' Accounts is not voluminous. That does not necessarily indicate the work which has been undertaken during the year by this committee,

nor does it show the service which the committee has rendered. In the deliberations of this committee, they act as an informal medium for the interchange of ideas which have proven to be extremely helpful to terminal accounting officers.

It is to be regretted that the members of the association have not submitted a larger number of subjects for handling by the Committee on Valuation Accounting. This committee, it seems to me, should cover a large field of important work, particularly in view of the many cases which are now before the Interstate Commerce Commission, either in the determination of the final value of the carriers under the Valuation Act or in the determination of values for purposes of recapture. The question of valuation for either of these purposes is a most important one for all the carriers and it is suggested that this committee can be the medium of crystallizing the many opinions which now exist in carrying on this important work.

The Committee on Statistics is doing an excellent work, and we confidently expect that when this committee shall have fully hit its stride, it will fulfill all the purposes for which it was formed.

Work of the Association

The standing committees of the Association are appointed for the benefit of its members and for the carriers whom they represent. Unfortunately, the subjects which these committees consider are those which are submitted, to a very large extent, by the membership of such committees. At the beginning of this year, a circular letter was sent to each of our members in which letter

on which conclusions had been reached by the various standing committees, until at the close of the year when the agenda was sent out to each member of the association. I believe, in this we have not carried out the idea contained in our constitution, for the reason that we do not give to the members of the association, except those who are fortunate enough to be on various committees, the conclusion reached by the committees after exchanging experiences among themselves until, in some instances, nearly a year after the conclusions of the committees have been reached. During the past year, the suggestion has been made by me to each of the standing committees, that, following the meetings held by the committees, a circular containing a synopsis of the more important subjects considered and the conclusions reached be sent to the officers interested. The Freight and Overcharge Committees have followed this suggestion, and it is interesting to know that the members of the association, who are particularly interested in the subjects relating to freight and overcharge accounting, have been given in advance the benefits of the results of the considerations to these subjects by these committees. I recommend this subject of sending out this data, immediately following the meetings of the various committees, be considered by the executive committee and the necessary action taken by them, as some of the committees felt that before they could undertake this change they should have the approval of the executive committee. It has been found by experience that, the sending out of data currently accomplished a long felt want, and it has also been found that the cost of mimeographing and sending out same is not prohibitive. It is my earnest hope that



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they were urged to make use of the machinery which the association has adopted for their benefit, and it was suggested therein that each member of the association, who had subjects either of individual interest or interest of the carriers as a whole, submit them to the secretary of the association for reference to the proper committee. In making some analyses of the subjects which were submitted to the association during the year and which analyses have been compiled from the Agenda, we find that the number of subjects reported were 281. Of this number, 212 subjects were submitted by 88 members of the association, and of the 212 subjects submitted by the members of the association, 156 were submitted by methods of the various committees. Thus it will be seen that of our 1,105 members of the association, all of the subjects submitted by such members during the past year came from 88 members of the association. Does this mean that such a large percentage of the accounting officers, who are members of the association, are content to let the "other fellow" submit the ideas for consideration by those who are rendering such an important service for the benefit of all, or does it mean that the members of this association do not realize the opportunity which we, as an association, have provided for them? The machinery set up is ample to take care of our needs, if each of us will remember that this is *his* association and will feel a personal responsibility resting upon him. If you have something worth while, why not help out by giving to your neighbor and fellow-worker the advantages which you have obtained by your special effort in any one thing? This carries out the spirit of the Association and the provisions of the constitution previously quoted.

Current Information

Prior to this year, no indication was given to the membership at large of the various subjects which were being handled and

your executive committee will take definite action in this regard as early as practicable. In doing this, I believe we will carry out the purpose for which the Association was formed, and on which it now operates, and this is "the greatest number."

Standard Invoice Form

The standard invoice form which has been developed in collaboration with other organizations, has been adopted by a large number of railways and industries selling materials and supplies to the railways. It is estimated that the use of this form will save over \$15,000,000 a year to the various industries of North America. The standard arrangement of the form is a decided advantage in accounting and checking, and the uniform size is of material convenience in filing. The adoption of this form by the railroads has been a great factor in getting this form into general use.

New Committees Recommended

Recently, there has been created a special committee of this association on water line accounting. That committee was brought into existence too late to make any recommendations for action at this meeting, but there is a need for such a committee, and there is much constructive work for it to perform. I also recommend that your executive committee give consideration to the adoption of a standing committee of the association on the accounts of short line railroads.

A new line of study which, in my judgment, our Association should undertake is the work of the accounting for electric railways. We have in our membership a very large number of accounting officers representing the electric railways, and I recommend to our executive committee the appointment of a standing committee on electric railway accounting. At first blush, this

may seem to conflict with the work of the Association of Electric Railways, but I believe we can, through the appointment of such a committee, be very helpful to our members who are engaged in this special line of work.

Simplified Divisions

This association has, for the last 30 or more years, called attention to the saving to the carriers as a whole by the adoption of simplified per cents, and it is gratifying to know that in the last few years considerable progress has been made. There is yet, however, much to be done, and we are urged not to let this subject rest where it is, but to be constantly calling our traffic officers, attention to the revision of the percentage sheets to accomplish this purpose. At the same time, their attention should again be called to the necessity of not establishing any rate over the line of two or more carriers without simultaneously publishing agreed percentage sheets shown in two figure per cents. Settlements between carriers are delayed in many instances several years because of a lack of agreed divisions on many of our through rates, and while it is true that this Association has, through its mandatory rules, provided for a temporary settlement on a mileage prorate, nevertheless, our accounts are necessarily held open for an indefinite period awaiting final agreements, and

our suspense accounts covering overcharge and other claims are on the increase, thus requiring an increased clerical force to make many thousands of adjustments of old items which would have been settled on a correct basis through interline settlement at the time of the original reporting of the waybill or claim, if we had division sheets for all of our present through rates.

Accounting Books

In the library of Congress at Washington, with its several million books and with its wealth of information concerning almost every subject, one can find only a few books on railway accounting—and most of them were written a number of years ago, and are not applicable to present day conditions. The book published by our association entitled "Railway Accounting Procedure," which book is edited by our efficient Secretary, covers its particular field and serves admirably as a reference book for railway accounting officers, as well as in many instances, text books in the various schools which teach, to some extent at least, the principles of railway accounting. But it is to be hoped that there will sometime be published books containing philosophical discussion of railway accounting. It is gratifying to know that some of the schools have provided correspondence courses in not only elemental phases of railway accounting, but also in the higher grades.

The Balance Sheet

Alfred P. Thom, general counsel of the Association of Railway Executives, who addressed the accounting officers at their Thursday morning session, gave his paper the title of "The Balance Sheet: Statement of the Account Between the Service and the Rate."

Mr. Thom reviewed the progress made by the railroads since their return to private control. He emphasized particularly the excellent service now being rendered by the carriers. The adequate, efficient and dependable service which the railroads of this country are now and have been rendering to the public has, he said, revolutionized business methods and trade practices in this country and is saving millions of dollars annually to the shippers of the United States.

Excerpts from Mr. Thom's address follow:

The record of service which the railroads have made during the trying and difficult period of recuperation after federal control, constitutes one of the most creditable and marvelous achievements of all industrial history. Nothing approaching it has ever heretofore been known in this or in any other land. It entitles them to the unqualified approval, support and protection of public opinion and to be regulated under a system dictated by an intelligent, stable and constructive public policy.

In view of this record, it would seem wise to permit them, unhampered by unfriendly and restrictive legislation, to continue the work, which they are performing so efficiently and in so fine a spirit, of furnishing the productive agencies of this country adequate and dependable transportation under laws already ample to check and remedy abuses. There are signs, however, that the policy of hunting down and hamstringing the railroads has not yet lost all its votaries and that the enmity and malice towards them still actuate and control some powerful influences among us. But happily these are a declining and, I hope, disappearing force, and the dawn of a better and juster understanding has appeared.

The great masses of the people are beginning to see the truth and to recognize the sincere and successful effort which is being made to serve and promote their highest interests. With this enlightened conception in the hearts of the people, those who seek the people's favor will abandon their program of unjust criticism and hostility, and the spirit of fairness towards this essential industrial factor will control. There will then be tranquillity and unfettered opportunity to do the public service.

By means of enormous investments and by greater and more intensive effort, the transportation situation has been changed from the deplorable condition existing at the termination of federal control so that at the expiration of the first quarter of 1923 there was no car shortage. Since that time the service has been substantially perfect.

It thus appears that the public has, in improved and perfected service, received the benefit of this large expenditure of new capital and that the increased expenditure has not resulted in a corresponding or in any increase but in an actual and substantial decrease of revenue to the carriers in comparison with the return on the much smaller capital investment in 1916.

What Is Value of Perfected Service?

The question which I wish to bring to your attention is, what is the value to trade and commerce of the perfected service which is now being rendered. What I want to find is an accountant—a real man—to strike a balance between industry and trade, on the one hand, and the railroads on the other, showing in dollars and cents how the account between the two stands in respect to the value of this transportation service—to translate into terms of money the benefits of the transportation service realized by the public as compared with the amount which is paid for it in the shape of rates.

The practical meaning of adequate and efficient transportation is to have with certainty the right kind of car, in proper condition, at the right place, at the right time, and to make prompt delivery of the shipment at the point of destination. During the past two years and more, car shortage has disappeared; the supply of cars has been made certain; the movement of freight has been speeded up and has been in accordance with schedule; the physical condition of the equipment and plant has been greatly improved; deliveries at destination have been made with promptness and certainty and complaints have ceased to exist. Adequate transportation has, in fact, been furnished the shippers of the country. What has been the significance of this adequate transportation service to business?

Savings by Prevention

One obvious item of value to business is the prevention of losses which would result from congestion and car shortage. In respect to items of this and of a similar nature, the savings incident to adequate service may be called savings by prevention, and the stupendous amount of these savings should be entered to the credit of the railroads on the general balance sheet between industry and trade, on the one hand, and the railroads of the country, on the other.

But there are other savings as well—perhaps more definite in kind—which should be also entered to the credit of the railroads upon this account.

In a true account, such as has been suggested, the items of savings for a prompt, adequate and dependable service, should find a place. Doubtless definite information as to what these savings amount to in the several departments and aspects of industry is not as yet available. But they are very real, and it is possible to indicate something of their nature and extent.

For example: The manager of a large copper company recently made a check on several hundred cars of ore and found that the average time required in transit had been reduced from 27 to 13 days. The saving in interest alone, due to expedited service, on this copper would, he said, go a long way toward paying the entire freight bill.

Reduced Inventory

It is reliably stated that at one of the largest automobile assembling plants in the Northwest, the dependability of transportation service has become so assured that it is no longer necessary to have in the warehouse the day before, or longer, the parts that will be needed in the process of assembling next day; but, because of the certainty of transportation service, the supply

needed each day in the process of assembling, can be taken that day direct from the car to the assembling plant and thus one handling, namely, that from the car to the warehouse floor, is saved, and this without incurring liability for demurrage on cars, thus saving the cost of labor in one handling, the cost of storage, and interest due to the reduced volume of supplies necessary to be kept on hand.

It is also reported that the Ford Motor Company, which in 1920 carried in transit and in their plants supplies of materials for from 60 to 90 days, are now operating on a five day supply, thereby making a saving of interest for 55 to 85 days.

An instance has been cited where a sheep raiser in Montana has declared that he was saved, in shrinkage alone, by expedited service, a dollar a head on lambs; and by adequate and dependable transportation service, which makes possible intelligent and systematic marketing, the sheep raisers of Idaho are said to have saved a million dollars during the past year.

The head of one of the leading department stores in St. Louis is reported to have said recently that in 1923 his company, because, as he said, of improved transportation service alone, carried an average stock of one million dollars less than the year before, at the same time doing considerably more business, and that the saving in interest on this one million dollars of reduced inventory had been sufficient to pay his entire freight bill for the year 1923.

Every large producer found it necessary in years past to maintain a force of men to act as tracers of goods moving in and moving out, so as to promote speed and certainty of deliveries in accordance with the needs of their trade or in satisfaction of their contracts. With prompt, continuous, adequate and dependable transportation, it has been found possible to reduce greatly, or to discontinue, this force, with the consequent substantial saving.

Similar experiences, will doubtless be found in every producing and in every retail and wholesale establishment throughout the country. There are lower inventories everywhere. Adequate, continuous and dependable transportation service has made it un-

necessary to accumulate anywhere, in any warehouse, the surplus of supplies that are required by prudence when such transportation service is not afforded. Quickened business, a more rapid flow of goods from point of production to consumer, will be found in every village and hamlet, as well as in every trade center.

Thus the money value to commerce of adequate and dependable transportation appertains to every branch and department of trade.

To the Credit of Good Service

These and many other similar items must be entered in the account to the credit of good service.

When this account is developed and is properly stated and understood, with all credits properly adjusted, it will be found that the apparent amount of the transportation charge will be greatly reduced, and rates which are now the lowest in the world will be seen to be even a smaller and a very insignificant charge upon the nation's industry. Their apparent amount will stand reduced by the credits due to the enormous savings which will be found to be incident to a perfected, adequate, efficient and dependable service.

What has happened to the rates since 1920 is, first, they have been *actually reduced*, so that, as above stated, users of transportation have paid for it, in the four years 1921-1924, \$1,698,116,000 less than they would have paid if the rates of 1920 had remained in effect; and, second, *practically they have been further reduced*, to an enormous amount, by the savings to shippers and more profitable methods of doing business incident to and made possible by the quality of transportation service being rendered—a service which could not have been rendered without the huge investment by the railroads of new capital.

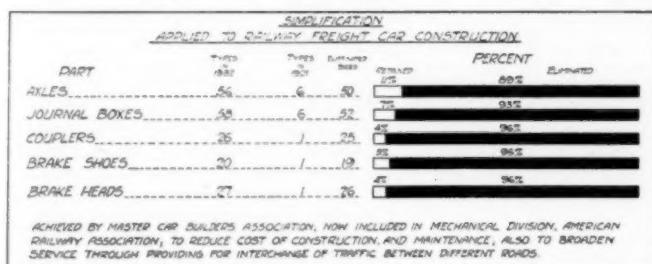
The proper balancing of accounts, so as to do justice to both, as between service and rates, will afford the carriers adequate revenues to maintain adequate service, and the rate structure of the country, as tested by all of the complex principles involved, will be just and reasonable.

The Red Ink Eliminator

Ray M. Hudson, chief of the Division of Simplified Practice of the Department of Commerce, entitled his address "The Red Ink Eliminator." His talk was illustrated with lantern slides. He said in part:

It may seem like "carrying coals to Newcastle" to dwell on the virtues of simplification and standardization, as waste elimination measures, to American railroad men—for in their mechanical departments they have been carrying on this work for years. But nowadays railroad managements are giving considerable attention to all departments of the road, with an eye to saving expense and reducing waste wherever possible.

For example, one large system has been overhauling and reorganizing its stores department. Its survey showed 140,000 dif-



ferent items carried in stock. Further study showed it unnecessary to carry so many different sizes and dimensions in common supply items. Then came the house-cleaning which eliminated over 62,000 items—a reduction of 44 per cent in variety. When this work began—inventories amounted to \$87,000,000. Twelve months later they stood at \$65,000,000—a decrease of 25 per cent.

In somewhat similar manner, another great carrier has cut its stores accounts from \$38,000,000 to \$20,000,000. It has been stated that this program, when applied by 40 large roads, released \$180,000,000 of capital formerly locked up in idle inventories, and slow-moving stocks.

This program has reduced stocks on hand from a six months to a three months supply—thus securing double the former turnover.

One good reason for this increasing attention to better stores control is the cost of carrying too many varieties. When it was

found that the average cost of carrying or maintaining supply stocks was 25 per cent of their value, and the obsolescence accounted for nearly $\frac{1}{2}$ of that cost,—the only logical course open was the elimination of the slow-moving, the non-standard,—and the excessive varieties so largely responsible for that obsolescence.

The way is open for this program to be extended further in the interest of greater economy. Manufacturers find they are likewise suffering from the curse of the odd size. Distributors, generally, are interested in quicker turnover and larger returns from a given working capital. Consumers also want better service, better value and relatively lower prices.

All that these groups need is a neutral meeting ground,—some friendly counsel, and a helping hand—to bring them together and guide them over a definite course to their common objective. That's where the Department of Commerce comes into the picture with its offer of service.

The response to that offer has been most gratifying. Today, we are co-operating with 200 different groups in simplification programs which will eventually mean some very large savings to the industries, the trade and the consuming public. The fields thus being rid of their burdens of waste include building materials, hardware, paints and varnishes, forged tools, sheet steel, containers, office furniture, plumbing supplies and fixtures, electrical supplies, small tools of all kinds, and many other items used in stations, freight houses, shops, offices and other places along the line.

To date, nearly 50 simplifications have been completed. For example—paving bricks have been simplified from 66 to 4 varieties; asphalt grades from 102 to 10; woven wire fence from 552 to 69; and forged tools from 665 to 351. The average elimination in 7 items in this field of miscellaneous construction materials is 80 per cent.

In sheet steel, the reduction from 1819 to 261 varieties means \$2,400,000 annual saving. Reduction of varieties of concrete reinforcing bars from 40 to 11 is saving over $4\frac{1}{2}$ million dollars a year, and so on. The simplification of warehouse forms, negotiable receipts, etc., to 18 standard forms is estimated to save 5 million annually.

The simplification of invoice forms is perhaps of greatest interest to you. Your association—the National Association of Purchasing Agents, and Division VI, Purchases and Stores of the American Railway Association, and the National Association of Cost Accountants co-operated in developing a standard form. Their efforts to secure a maximum recognition and use of this form (which you call R. A. O. A. form 201) met with a fair degree of success. Last year—the committee behind the form requested our co-operation in extending the use of this form. A general conference of

all interests were held at the Department of Commerce on January 14, 1925. The conference unanimously approved the form as submitted, and then we made a nation-wide canvass in its behalf. To date we have received signed acceptances from 18 railroads, 11 supply houses, 19 trade associations and 123 other bodies representing manufacturers, distributors or consumers of goods moving over your lines. It is estimated the use of this form, and also the standard purchase order and inquiry form will save \$15,000,000 annually in printing, clerical labor, errors, misunderstandings, disputes and litigation, etc., etc. Add this \$15,000,000 to the \$20,000,000 which it is said has resulted from the adoption of interline waybilling and you have a very vivid picture of the possibilities in simplification of papers, documents, etc., to make some further savings through co-operating in the simplification of these items.

I would suggest to you, as accounting officers, a study of the excess costs imposed on your roads due to this lack of standardization and simplification in machines, tools, dies, jigs, fixtures,

drills, taps, grinding wheels, belts and a hundred other items of common usage in the shops "behind the line."

Invariably, surveys show that 80 per cent of the demand is in 20 per cent of the varieties offered. Why then continue to purchase items in that 80 per cent of variety which means only 20 per cent of the demand? The order of the day is mass-production and mass selling. Items for which there is little demand eat up money and their appetites must be fed by extra charges in the prices of those items which sell readily.

The story boils down to this statement. More and more of our purchasing agents, our store keepers, our accounting officers, our shop superintendents, and our executives are finding that too many varieties is the mother of excessive investment, greater cost to carry, slow turn-over, rapid obsolescence, decreased profits and economic waste. There is only one logical way out and that is to apply the necessary corrective measures at the source of the trouble, and eliminate all the waste possible in your 2½ billion dollars of annual purchases.

Letter from Commissioner Eastman

Interstate Commerce Commissioner Joseph B. Eastman was invited to attend the accounting officers' meeting but was unable to be present. He did, however, send a letter accompanied by a memorandum from Alexander Wylie, director of the I. C. C. Bureau of Accounts.

Commissioner Eastman and Director Wylie both referred to the still pending revision of the accounting classifications.

In this connection, Mr. Eastman said:

The work of revising our accounting classifications for steam roads, upon which the Bureau of Accounts has been working for some time, has met with considerable delay. In part this delay has been due to the difficulty in obtaining an expression of views from your association in regard to changes which our bureau has suggested in the present classifications. It has seemed to me, as I have thought this over, that if differences of opinion exist among the accounting officers in regard to these questions, it would be well if we could have the benefit of those differences of opinion rather than that further delay should be incurred in an attempt to reconcile what is perhaps irreconcilable. The expression of frankly divergent views might indeed be more helpful to us than the expression of a view upon which agreement has been reached only through a process of compromise and concession.

Memorandum from Director Wylie

In his memorandum Mr. Wylie said:

This bureau in its field examinations has noted a lack in many instances of the proper accounting in connection with expenditures for additions and betterments. The inaccuracies discovered have apparently arisen from a lack of close co-ordination between the accounting and construction departments of carriers or to a lack of diligence on the part of accounting officers in recording capital expenditures upon the basis of actual accruals of such expenses. These inaccuracies have made necessary adjustments in the operating accounts in subsequent periods to that in which the transactions have actually occurred and have in some instances resulted in improper showings of recapturable income.

Reserves

A number of the smaller roads, whose business consists principally of the transportation of one commodity, such as lumber, oil, coal or other minerals, are now foreseeing the exhaustion of the source of such traffic and are desirous of providing reserves to cover the anticipated loss upon the forced abandonment of their properties. The accounting officers of some of these carriers apparently have not understood the provisions of the accounting rules which provide for the creation of such reserves. Should the accounting officer of any such carrier now be in doubt as to the proper procedure in the establishment of reserves of this kind all necessary information can readily be obtained by him upon addressing the director of the Bureau of Accounts.

There have been much controversy and many suggestions in view of simplifying the accounting in connection with the rebuilding of equipment and fixed improvements. The application of the major renewal rule with respect to heavy repairs of units of equipment and fixed improvements has resulted in the inclusion of large amounts in the capital accounts of roads which only periodically or at long intervals restore their units of property

while similar expenditures made by roads which currently maintain their units of property have fallen in the operating expense accounts. The general accounts committee has expressed the opinion that the major renewal rule should be discontinued. The matter is now being given very careful consideration by the commission.

The Revision of the Classifications

With respect to the revision of the accounting classifications of steam roads: A revision in tentative form of operating revenues has now been prepared and the chairman of the committee especially appointed to co-operate with this bureau with respect to the revision of these accounts has advised that his committee will be ready to confer with representatives of the bureau in regard to the revenue accounts shortly after the close of the Atlantic City convention. The other classifications will be in shape for consideration as soon as the work on the operating revenues has been completed.

The accounting officers are not at all unanimous in their opinions as to the form the revision of the classification of operating expenses should take. The primary accounts now prescribed with the exception of the depreciation accounts were adopted with substantially full concurrence of the accounting officers. Many of the Class I carriers which are using the primary accounts in a greater or less degree in connection with the carrying on and supervision of their operations do not care to have the number of accounts reduced. If fewer accounts are prescribed they will desire permission to subdivide into substantially the same number of accounts as now provided. Other carriers are of the opinion that they can get along with a greatly reduced number of accounts. One solution of the problem would be to make only the minor changes which are necessary in the primary accounts as now provided and to provide a condensed classification which might be used by Class I roads when so authorized by the commission upon a showing that a material saving in expenses would actually be effected and the furnishing of a certification that a greater subdivision of the accounts was not necessary for the purposes of the particular railroad making the application for use of the condensed classification. This plan would doubtless lead to an investigation of the subject by all carriers and would probably impel those now asking for a condensed classification to accept one substantially in the same detail as that now in effect.

In the preparation of the classification of operating accounts it is planned to give very careful consideration to providing, so far as practicable, for the essential elements of cost accounting. It must be recognized, of course, that the proportion of directly assignable expenses in connection with the various classes of transportation is relatively small; that the proportion of these expenses which must be assigned upon a more or less arbitrary basis is relatively large as compared with most other industries.

Investment in Miscellaneous Physical Property

The carrier's investment in *transportation* property under the accounting rules is required to be classified in account 701, "Investment in road and equipment," and its investment in other physical property is required to be classified in account 705, "Miscellaneous physical property." Notwithstanding the effective classifications have now been in effect for substantially 10 years, a considerable number of carriers have neglected to eliminate from account 701, "Investment in road and equipment," their investments in miscellaneous physical property. The importance of the necessary adjustments on account of such investments might appropriately be called to the attention of the accounting officers.

Report of the Committee on General Accounts

The committee on general accounts, W. C. Wishart, comptroller of the New York Central, chairman, reported on 23 subjects. Among the important subjects covered were the following:

Revision of I. C. C. Accounting Classification. The report on this subject was a progress report detailing particularly the decision of the committee with reference to the tentative revision of the operating expenses classification offered for discussion last fall, and which the committee opposed. As noted in the president's address and the memorandum of Director Wylie, this matter is still in abeyance.

Value of a Unit of Equipment as Rebuilt. This subject has received attention in the docket of the general accounts committee for a number of years. The committee reported its opinion "that the present provision of the classification in regard to accounting for rebuilt equipment should be eliminated, and that all repairs to equipment—where the design, type and capacity are not changed—should be charged to operating expenses."

Separation of Expenses Between

Freight and Passenger Service

Rules Governing Separation of Operating Expenses Between Freight Service and Passenger Service. This subject was continued on the committee's docket from last year. The committee's report quoted a letter from Interstate Commerce Commissioner John J. Esch, reading as follows:

"Referring to my letter of February 18, 1924, which acknowledged your letter of February 14, 1924, addressed to the Interstate Commerce Commission and transmitting a resolution recommending that the rules for the separation of operating expenses between freight service and passenger service be made optional:

"Correspondence with railway executives indicates that the majority would not make the separation if not required to do so, although a considerable number regard it a useful part of railroad statistics and would in any event continue the analysis. There is apparently a difference of opinion as to the expense involved. A number say the expense is negligible, while one road says it costs \$15,000 per annum. The various state commissions are very strongly, although not unanimously, in favor of having the separation retained. Various persons whom I addressed as having frequent occasion to use railway statistics in connection with rate cases or as students, are mostly in favor of retaining the separation in whole or in part. Looking at the matter from the standpoint of the needs of this commission, I think we should be seriously inconvenienced in our work if this information were not available.

"The commission, by Division 4, has considered the matter carefully and has decided that it is inadvisable at this time to make optional the separation of operating expenses between freight service and passenger and allied services."

There was also quoted a letter from M. O. Lorenz, director of the I. C. C. Bureau of Statistics, which included among other details the following:

"I have given considerable thought to your repeated suggestions that some way should be found for reducing the clerical labor involved in the separation of operating expenses between passenger and freight services. I do not see my way clear, in view of the usefulness of these figures in a variety of problems, to recommending either that the separation be discontinued or made optional. However, it is possible that substantially as good a separation as we now have can be made with less labor."

The committee reported that it requested the president of the Railway Accounting Officers Association to submit to the Association of Railway Executives a review of the developments on this subject and asked that the subject receive consideration by the American Railway Association. It was also announced that the Interstate Commerce Commission is awaiting recommendations from the accounting officers as to how the work can be done at less expense.

Elimination of Unnecessary Reports and Statistics. The committee recommended that this general subject be dropped from the docket, since specific portions of the subject will be considered as separate matters on the docket of the committee.

Accounting for Cost of Improvements Placed by Carriers upon Piers Owned by the City of New York, and Leased by the Carriers for Terminal Uses. The Committee on General Accounts reported its opinion that the cost of improvements placed by carriers upon piers leased from the City of New York shall be charged to Account 702, "Improvements on Leased Railway Property"; that such expenditures shall be considered as depreciation, and shall be apportioned over the leasehold term through monthly charges to Operating Expenses, Account 242, "Wharves and Docks, Depreciation"; that the contra credits shall be made to Balance Sheet Account 775, "Accrued Depreciation, Road"; and that at the expiration of the lease the amounts charged to Account 702, "Improvements on Leased Railway Property," shall be credited thereto and debited to Account 775, "Accrued Depreciation, Road."

It was also pointed out that this subject is of leading importance because the theories involved might be applied to any leasehold arrangement such as a leased line, etc.

Stored Freight Cars and Number of Locomotives Stored. This subject was brought up by M. O. Lorenz, director of the I. C. C. Bureau of Statistics. He advised that he had communicated with a large number of railroads with reference to the definition of a stored car and had found a considerable variation in the interpretation of the term. The committee advised that the matter was in the hands of a sub-committee, which was working with a sub-committee of the American Railway Association.

Destruction of Records. The committee made a progress report. It was pointed out that the present requirements for the storage of records were severe and that it was desirable to keep the matter before the Interstate Commerce Commission in the hope of effecting a reduction in the burden. The subject is being handled by a sub-committee and was continued on the docket.

Accounting for Recapture

Accruals in Connection with Recapture. The committee's report was contained in Bulletin No. 108. There was therein presented a resolution which had been unanimously adopted by the committee with instructions that it be transmitted to the Association of Railway Executives and a copy handed to the representatives of the Interstate Commerce Commission. The resolution said in part:

REPORT OF THE COMMITTEE ON GENERAL ACCOUNTS, RAILWAY ACCOUNTING OFFICERS ASSOCIATION, IN REGARD TO ORDER OF THE INTERSTATE COMMERCE COMMISSION DATED JUNE 2, 1924, WITH REFERENCE TO RECOVERY AND PAYMENT OF EXCESS NET RAILWAY OPERATING INCOME UNDER SECTION 15-A OF THE INTERSTATE COMMERCE ACT.

The order of the Interstate Commerce Commission dated June 2, 1924, provides that in determining the amount of recapturable incomes the Commission will exercise the power to determine the reasonableness of estimates included in the accounts to represent unaudited items and will initiate charges or credits in the returns for this purpose where necessary to correct a deficiency on the part of the carrier.

The order also provides that balances in accounts 727 "Other unadjusted debits" and 778 "Other unadjusted credits," representing unaudited items shall be analyzed and explained according to the primary accounts used in creating the suspense items. Balances for each year shall be kept separately.

If applied literally, the order will compel carriers to initiate estimates either in the accounts or for the purpose of including such amounts in returns rendered for recapture purposes under Section 15-A of the Interstate Commerce Act, which have not appeared necessary in the past, or were impracticable except at prohibitive accounting cost.

Discussion with commission's representatives has developed that the principal estimates which the commission has in mind are the following:

1. In transit freight representing carrier's proportion of freight charges on shipments for which revenue had not been reported and accounted for within the current period.
2. Freight overcharged not refunded.
3. Restatement of passenger revenue to a basis of service rendered.
4. Restatement of hire of equipment accounts to reflect in current account, current performance.
5. Estimates of loss and damage payments for which claims have not been presented and claims presented, the investigation of which has not been completed.
6. Estimates of possible personal injury and other casualty payments.
7. Estimates of joint facility, car repairs and other expenses and revenues when bills or vouchers have not been rendered or received.

Your committee has conferred with representatives of the commission, and submits this report in response to their request for constructive suggestions. A sub-committee of your committee has had two conferences with representatives of the Interstate Commerce Commission, one extending over a period of four days at Chicago, and has thoroughly analyzed all phases of accrual accounting as it apparently is intended to be carried out for recapture purposes in the order of the Interstate Commerce Commission dated June 2, 1924.

In endeavoring to get to the bottom of the question and bring out the advantages and disadvantages of various plans, the sub-committee of your committee had the co-operation and assistance of auditors of freight accounts, auditors of ticket accounts and car accountants of four of the larger railroads operating out of Chicago.

Based on estimates of increased costs furnished by some of the Chicago carriers, it is estimated that to literally carry out the plan outlined in the order of June 2, 1924, accruing on estimated bases and exhausting subsequent revenue and expenses against the reserves by periods, will result in an increased expenditure of Class I railroads of not less than \$5,000,000 per annum, which would be of no avail to the carriers. It is not apparent to your committee that the commission can obtain any benefit from the proposed estimated basis and the actual exhaustion of the reserves created thereby which will justify, on the part of the carriers, an annual expenditure of not less than \$5,000,000. In other words, from the investigation we have conducted, it would indicate that the \$5,000,000 annual additional cost would be practically thrown away.

It is admitted by the commission's representatives that adjustments of differences between estimated amounts included in the accounts and amounts of actual payments is a proper charge or credit to the year in which the adjustment is made, and they appreciate, such being the case, that the accounts in the period in which the adjustment is made are distorted by the amount of such adjustment which distortion, in the judgment of your com-

mittee, will be greater than any possible difference that may exist in the lag-over from year to year, due to the fact that estimates, except such as are based on a definitely known liability, must be a guess, and the experience of carriers has demonstrated that, especially in estimates such as personal injury and other casualties, loss and damage to freight and car repairs, the estimates have either fallen very far short or have been very much in excess of the actual, the result being a clearance to operating accounts long periods after the liability had been incurred or the revenue earned, with its consequent distortion in that subsequent period.

Where the estimated basis has been used over a period of time such adjustments do not materially affect the current account because they are fairly near normal, but where there is a change from the payment to the estimated basis, or vice versa, the accounts will be distorted to a very appreciable extent in the period of the change and necessitate practically two sets of records.

Your committee does not feel that where certain carriers are using certain bases, such bases need necessarily apply to other carriers. There are various elements to be taken into consideration which make special treatment at times very necessary. Geographical location of carriers has, at times, a very decided bearing on the method of accounting, special traffic conditions may influence either one or the other methods of stating the accounts, and undoubtedly there are other elements which should be given consideration.

It is felt the commission should seriously consider the entire question before issuing any order which materially disturbs the accounts of carriers, and there is no justification for forcing carriers, which are not within the range of recapture, to change their entire accounting structure merely because there may be a few that do come within that class.

Your committee calls attention to the requirement of the present classification which provides that the accrual (estimated) basis shall be used "when practicable."

The present accounting practices of carriers have been in effect for many years, and the commission has knowledge of those practices, through examinations in the carriers' offices and reports rendered to the commission; at least to that extent, the commission has approved the carriers' accounting

practices. Any upsetting of these practices must necessarily have effects with various ramifications.

Proposed Revisions of Annual Report Schedules. The committee accepted suggestions made by Dr. M. O. Lorenz, director of the I. C. C. Bureau of Statistics for revisions of the I. C. C. annual report schedule relating to ties and rails, and of the schedule relating to "proprietary companies." Action on a similar recommendation for changes in Schedule 511—Grade Crossings was deferred.

Basis for Comparing Material Balances on the Various Lines. The committee on general accounts approved the following recommendation of the committee on disbursement accounts.

Inasmuch as the American Railway Association, Division VI, Purchases and Stores, now has a recommended classification of materials and supplies, showing the details of such items, it is the opinion of this committee that if any other classification or grouping of classes of material is desired, such grouping should be made by consolidation on the basis of whatever classification is observed by the individual carrier. Your committee is of the opinion that it is not necessary to subdivide the General Ledger Account—Material and Supplies—in the manner suggested, and that comparisons, to be of value, must be based on special studies.

Accounting for the Results of Pooled Passenger Train Service. The committee reported its opinion that the joint facility accounts should be extended to include pool train operation. Upon this basis, each road member of the pool would charge its initial expense to the appropriate primary accounts and compile corresponding statistics. When adjustments are made with other member roads, the amounts involved would be handled through joint facility accounts without disturbing primary account figures or statistics. The committee recommended that the classification be so changed.

Report of Committee on Freight Accounts

This committee, J. P. O'Malley, assistant comptroller of the Baltimore & Ohio, chairman, reported on 101 subjects. The committee held four meetings during the year covering a total of 11 days. Among the important subjects handled were the following:

Time Limit for Adjustments. The committee submitted the following report:

At the 1924 meeting of your association, certain rules were adopted to become effective July 1, 1925, relating to the time limit for issuing statements of differences and correction accounts and for making adjustments through junction accounts. These rules appear on Pages 33 to 36 of the 1924 Procedure and are styled No. 30, effective July 1, 1925, and No. 31, effective July 1, 1925. This year's freight committee reached the conclusion that these rules could be constructed in a manner that would make them much more easily understood, and accordingly rearranged the rules and changed the verbiage in the manner set forth in the following copy of the proposed revised rules.

In addition to the rearrangement, the committee recommends in the revised rules, slight changes in the limits for intrastate traffic and for Canadian traffic. The rules adopted last year relating to intrastate traffic, provide a five year limit for all adjustments. The revised rules provide for a three year limit in making adjustments when there is no change in the basis of settlement with shipper or consignee, and a five year period for making adjustments involving such changes in the basis of settlement. The rules relating to Canadian traffic adopted last year, provide a five year period for making adjustments not involving collections from shippers or consignees, and a three year period for making adjustments involving collections from shippers or consignees. The proposed rules provide for a three year period for making adjustments where there is no change in the basis of settlement with shippers or consignees, and a five year period when such changes in the basis of settlement are involved.

If these revised rules which the committee proposes are approved at the coming annual meeting of the association by a sufficient majority, they will become effective July 1, 1925 (note below change to January 1, 1926) and will supersede those adopted at the last annual meeting to become effective on that date.

Interstate Traffic. (Effective July 1, 1925.) Statements of differences covering interstate traffic received after the expiration of three years from date of original settlement may be declined; except that when such statements of differences are made on correction accounts issued and settled within the three year period upon an incorrect basis, they shall be accepted and handled if received within four years from the date of the original settlement.

Correction accounts covering interstate traffic issued upon the motion of the settling carrier and included in interline settlement after three years from date of the original settlement, may be declined by initial or intermediate carriers.

Correction accounts based upon statements of differences made by initial or intermediate carriers within three years from date of original settlement when issued against such settlements, or within four years from date of original settlement when issued against correction accounts, shall be accepted by all carriers involved; provided, however, that if any carrier is debited or credited with amounts due to or from shippers or consignees concerning which the carrier has not received advice by statement of differences or correction account within two and one half years from date of original settlement, and such amounts are uncollectible or unrefundable, readjustment shall be made with all carriers involved to the basis existing before such correction accounts were included in settlement. (Effective July 1, 1925.)

Intrastate and Canadian Traffic Not Involving Adjustments With Shippers or Consignees. (Effective July 1, 1925.) Statements of differences covering intrastate and Canadian traffic not involving adjustments with shippers or consignees, received after the expiration of three years from date of original settlement may be declined; except that when such statements of differences are made on correction accounts issued and settled within the three year period upon an incorrect basis, they shall be accepted and handled if received within four years from the date of the original settlement.

Correction accounts covering intrastate and Canadian traffic not involving adjustments with shippers or consignees issued upon the motion of the settling carrier and included in interline settlement after three years from date of the original settlement, may be declined by initial or intermediate carriers.

Correction accounts based upon statements of differences made by initial or intermediate carriers within three years from date of original settlement when issued against such settlements, or within four years from date of original settlement when issued against correction accounts, shall be accepted by all carriers involved. (Effective July 1, 1925.)

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Intrastate and Canadian Traffic Involving Adjustments With Shippers or Consignees. (Effective July 1, 1925.) Statements of differences covering intrastate and Canadian traffic involving adjustments with shippers or consignees, received after the expiration of five years from date of original settlement may be declined; except that when such statements of differences are made on correction accounts issued and settled within the five year period upon an incorrect basis, they shall be accepted and handled if received within six years from the date of the original settlement.

Correction accounts covering intrastate and Canadian traffic involving amounts due from or due to shippers or consignees issued upon the motion of the settling carrier, and included in interline settlement after five years from date of the original settlement, may be declined by initial or intermediate carriers.

Correction accounts based upon statements of differences made by initial or intermediate carriers within five years from date of original settlement when issued against such settlements, or within six years from date of original settlement when issued against correction accounts, shall be accepted by all carriers involved; provided, however, that if any carrier is debited or credited with amounts due to or from shippers or consignees concerning which the carrier has not received advice by statement of differences or correction account within four and one half years from date of original settlement and such amounts are uncollectible or unrefundable, readjustment shall be made with all carriers involved to the basis existing before such correction accounts were included in settlement. (Effective July 1, 1925.)

The proposed change in the rules resulted in much discussion, objection being offered by roads that were not up to date in their

accounts. The committee, as a result of this objection, proposed that the effective date be postponed from July 1, 1925, to January 1, 1926. This not being satisfactory to some, a motion was made that the rule should be changed so as to become effective with waybills settled July, 1925, and thereafter (or, as a result, on July 1, 1928,) but this motion was defeated. In the discussion relative thereto, it was pointed out that the change in the rule as suggested by the committee was due to the legal requirement embodied in a federal statute that undercharges cannot be collected from the public or overcharges refunded to patrons after three years. It was also pointed out that the carriers have had notice of the rule for more than a year, and that many carriers had worked hard to catch up. The suggested six-month postponement would further permit carriers now in arrears to catch up. The postponement to January 1, 1926, was adopted and it was also provided that a note would be added to the rule saying that it did not apply to traffic department disputes about divisions, to retroactive divisions or to decisions of federal or state commissions.

Uniform Style of Paid Stamps. A motion that this subject be referred back to the committee for the consideration of the adoption of a uniform paid stamp was rejected.

Division and Percentage Sheets. This subject referred to the best method of assuring that the accounting department is in possession of the proper and effective division and percentage sheets. The committee was of the opinion that this is a question to be handled by the individual carriers with their traffic departments.

Combining Division Sheets with Tariffs. This subject was submitted by the secretary of the Freight Station Section of the American Railway Association. The committee's recommendation was explained at the meeting by A. J. Moran, auditor freight accounts of the Erie, and was as follows:

The Railway Accounting Officers Association has given these subjects considerable thought, and have had the matter of simplified divisions, also the issuing of division sheets simultaneously with tariffs, before it for a number of years. While the progress has been slow, nevertheless during the past two years substantial results have been obtained. The Trunk Line, Central and New England Freight Associations have reduced all percentages applying in and between their respective territories to a two figure basis. Further, the principle has been generally adopted by traffic officials that where through rates have been put into effect to publish percentage divisions at the same time.

The lack of divisions, also disputed divisions and complicated division bases on inter-territorial traffic are mainly responsible for the conditions of which the Freight Station Section complains. Considerable progress has been made in adjusting intra-territorial disputed divisions within the official, Western and Southern Territories, but there is no evidence of similar progress being made by traffic associations in adjusting inter-territorial divisions of which many are in dispute.

The Railway Accounting Officers Association has always advocated through billing where through rates and percentage divisions are in effect. Although some carriers have in effect through billing arrangements where there are no through rates in effect, this class of interline freight accounting is undesirable for the reason that such interline waybilling is expensive to handle in the freight accounting office, and where intermediate carriers are involved, there is no way that such carriers can check and protect their revenues without obtaining a copy of waybill from waybilling carrier.

The Railway Accounting Officers Association appreciates the fact that agencies at rate breaking points are burdened with the handling of amounts in their accounts, due to disputed divisions, but to transfer the work of verifying rates up to the junction points by providing through billing for this traffic would involve a very wide distribution of tariffs to carriers which are not parties thereto, which expense, coupled with that of making the verification in the audit office, would exceed the expense under the present practice.

In order to relieve junction agents of as much work as possible, differences arising out of disputed divisions should be relieved currently by audit office.

The constant agitation on the part of freight accounting officers and agents in having this matter brought to the attention of the various traffic associations, should eventually result in appropriate action being taken in providing some means of arbitration to settle these questions without individual carriers taking up direct with the Interstate Commerce Commission as has been done. Such action will warrant the expense and offset the unnecessary expense now involved in the freight accounting office and at junction stations.

The Freight Station Section of the American Railway Association can help materially by having the traffic section of their association bring this matter to the attention of the various traffic associations in the different sections of the country. The Railway Accounting Officers Association will take similar action.

Abstracts, Division Statements and Correction Accounts. The

committee's recommendation as it appeared in the Agenda was that there should be added at the end of paragraph 4 in the mandatory freight accounting rules the words "Weight shall be shown in pounds" and that the same be added to rule 20 after the word "description." The committee later announced its desire that the matter be referred back for further consideration.

Making Mandatory Rules for Junction Settlement Plan of Freight Accounting. The committee's recommendations related to rules 93 to 109 and appeared in the Agenda. The committee later decided to make certain changes so as to bring the situation in conformance with the findings reported above under the subject "Time Limit for Adjustments" and to leave in rule 103, which it had first been proposed to eliminate.

Harmonizing Overcharge Rule and Freight Accounting Rules. The committee recommended the adoption of the following:

1. a. The Freight Mandatory and Overcharge Claim Rules should be cross indexed.

b. The rules cross indexed should not be changed without joint action of the Freight and Overcharge Committees.

2. Freight Rules 54 to 60 inclusive and Overcharge Rules 30 to 35 inclusive, have been revised and placed in harmony. Freight Recommendatory Rules 209, 210 and 214 to be eliminated as they are covered by the Freight Mandatory Rules.

3. Freight Recommendatory Rule 278, should be eliminated as the matter is now carried in Freight Rule 15 and Overcharge Rule 30. Rule 15 to be retained without change. Rule 30 has been harmonized with other freight rules as per No. 2.

Paper for Printing Waybills. The committee recommended that Rule 3a be changed to read as follows:

3a. *Paper for Printing Waybills.* In printing waybills, use manila paper not less than 75 per cent sulphite, not less than 50 pounds to ream of 500 sheets size 24-36 (manufacturer's standard basis of size), and not less than .25 breaking strength under Mullen test.

This recommendation was the cause of considerable discussion, some of the members desiring to permit more room for individual choice in the specification. It was pointed out that the specification would increase the cost of the paper but that such would be more than compensated for by the savings due to having better paper which would not crack or tear. It was also shown that the committee had given the matter a great amount of discussion, and had adopted the specification only after having had the advice of expert printers and paper men. A motion to amend the specification was rejected.

Cause and Prevention of Overcharge Claims. The committee quoted a letter from the secretary reading in part as follows:

"The prevention of overcharges and undercharges in freight revenue has been a subject which has been continuously before our committee in one phase or another for several years past, as reports of the association will show the membership has been circularized and other efforts directed towards an initially correct settlement of freight transportation charges.

"The 1924 edition of the Railway Accounting Procedure, pages 91 to 102, embodies suggestions for the prevention of these over and undercharges through the careful and intelligent revision of waybills at the source, as well as at destination.

"The relationship between an initially correct freight revenue assessment and the simplification of freight traffic publications is recognized. The reports of the association will indicate the attention given that particular phase from time to time by that body.

"The committee on freight accounts, primarily in the interest of efficiency and economy in freight auditing, has very much in mind the prevention of over and undercharges."

T. H. Seay, auditor of freight accounts of the Southern, spoke briefly concerning the importance of this subject, and pointed out that it is a question of better relationships with patrons. He said that the carriers should make every effort to have a larger proportion of initially correct settlements. The situation, he said, will be found to have an effect on legislation dealing with railroads.

Rules Governing the Issuance and Accomplishing of Bills of Lading. The committee had recommended that it is not advisable to issue general instructions covering this subject. The individual carriers have issued, through their traffic, treasury and accounting departments, necessary instructions to their agents governing the issuance and accomplishments of bills of lading. The committee later asked that the matter be referred back to the committee for further consideration.

Report of Committee on Passenger Accounts

The committee, E. J. Johnson, auditor passenger receipts, Northern Pacific, chairman, held three meetings during the year, covering a total of eight days. Its report included findings on 55 subjects. Among the important matters considered were the following:

Redemption of Old Date Tickets. The committee recommended

that the following paragraph appear in future editions of the Railway Accounting Procedure after paragraph 612 on page 407 of the 1924 Edition:

"The time limit within which unused or partially used tickets should be redeemed will be left to the discretion of the individual carriers."

Cost Units in Passenger Accounting. The committee said that it had given this subject much thought and consideration and is

of the opinion that while some formula could be adopted for the determination of the relative costs of performing a few classes of operations, the committee did not believe that the varied manner in which the respective accounting offices conduct their routine work will permit of the successful employment of a formula for passenger accounts that could be used by carriers generally. Some carriers have a formula which enables them to determine the cost of many operations incident to work in the accounting department, but same is localized to their individual methods. The committee recommended that where cost units in passenger accounting are thought desirable, they be ascertained by individual carriers in relation to the requirements peculiar to their routine methods.

Revision of Form of Banana Messenger Return Ticket. The committee, after conference with traffic department representatives, recommended a standard form of ticket to be placed in effect on January 1, 1926. It was announced that the formal concurrence of the fruit shippers had been received since the issuance of the Agenda.

Uniform Excess Baggage Checks. This subject was left with the committee for further discussion. It was stated that negotiations were contemplated with the Association of General Baggage Agents.

Conductor's Continuous Passage Train Check. The committee offered a new standard form No. 33 "Train Exchange Ticket" and outlined the reasons for its adoption and a suggested method of its use.

Definitions of Passenger Accounting Terms. This question was outlined by L. D. Lacy, auditor passenger traffic of the Chesapeake & Ohio, as follows:

To the uninitiated, railway accounting names and terms are often a source of perplexity and confusion. In no field of accounting is this so true as it is with railroad accounting. Matters covered thereby have to be placed under a name or term which necessarily has to be condensed and only the one who is trained in the accounting field can be expected to be

familiar with the meaning of the terms of the particular branch of accounting work wherein he is employed. Often it is the case that even those engaged cannot glibly define every term in use. Then again, when we glibly make use of our terms, it is with the thought that everyone understands them. Yet, when a passenger accountant hears a freight accountant speaking his language we often wonder what it is about which he is talking and he no doubt thinks the same about us. The question has often been asked if there is not some publication or list from which information of this nature can be obtained in brief or concise form. If there is, I have never heard of it.

No reference work can be said to be complete that does not contain a definition of the principal terms covered thereby. We consider an index indispensable, a summary of contents is useful, annotations are read to advantage, but none of these take the place of the glossary.

In our reference book styled "Railway Accounting Procedure" we have what is often called the "Railway Accountant's Bible." The high order of this invaluable text book on Railway Accounting has been attested to by some of the leading technical and other publications of the country. We, who have to refer to it, find it a lamp to our feet and a source of information which could be obtained in no other way. It is splendidly edited, it is well indexed and is as complete and thorough as the mind of man has been able to make it. It is now being given a wide circulation and is consequently placed in the hands of many persons who are not as familiar with railroad accounting as those directly connected with the work.

There is only one thing needed to make the "Procedure" all that the ambitious student, the accountant, the layman could desire and correspondingly enhance its value and that is the incorporation therein of a glossary that will define the accounting and technical terms in such manner as would unfold their meaning so clearly that all who read may understand.

Tickets to Show Fare at Which Sold. The committee recommended that carriers, with the approval of their passenger traffic departments, instruct their ticket agents to endorse, with ink, on blank destination local tickets and on the initial coupon of interline tickets, the fare at which tickets are sold as an aid to the accounting and passenger traffic departments in connection with various questions that arise from time to time in which this information would prove valuable.

Report of Committee on Disbursement Accounting

This committee, J. C. Wallace, general auditor, Cleveland, Cincinnati, Chicago & St. Louis, chairman, had three meetings during the year for a total of eight days. It reported on 24 subjects. Mr. Wallace, in presenting the report, said that the committee had reported this year on fewer subjects than in past years—on one-half as many, in fact, as last year. He pointed out that this had permitted more constructive work. He referred particularly to the reports on fuel accounting and payroll accounting, which had been in the hands of the committee in past years, and on which the final reports had been prepared for publication this year. The disbursement committee had formerly devoted its attention primarily to interpretations of the classification of operating expenses. It has now engaged in broader activity which Mr. Wallace believed would put it more on a parity with the freight and passenger accounts committees. Mr. Wallace also pointed out that the new subjects covered by the committee would offer means of greater co-operation with the other railway associations. Thus, the report on fuel accounting should prove of interest to the purchases and stores, operating, and mechanical officers as well as to the accounting officers.

Mention has been made above of the length of the reports on fuel and payroll accounting. It is hoped to have separate articles on these reports in future issues of the *Railway Age*. Among other important subjects handled by the committee were the following:

Determining Unit Expense of Turning Locomotives at Engine-houses. The committee submitted the following as information:

(1) To what extent should accounts 388 and 400, Enginehouse Expenses—Yard, and Enginehouse Expenses—Train be detailed?

(2) What method should be adopted for counting locomotives as being turned?

(3) Can a formula be prepared that is adaptable to all roads and can be endorsed as a standard form?

1. Assuming that the question did not mean that the accounts in the general offices should be in more detail than now, but that the question meant

more particularly the separation of the accounts on the enginehouse cost statements, your committee investigated the methods of a number of carriers and find much variation in their practice.

Some carriers throw all the expense of an enginehouse into one general pool and divide that pool between freight and passenger on the basis of the number of engines handled. A larger number of carriers, however, divide the work into several classes, the following being fairly representative:

1. Fueled, watered and sanded.
2. Turned on table.
3. Fires cleaned.
4. Fires knocked.
5. Brick work cleaned on oil burners.
6. Boilers washed.
7. Water changed.
8. Flues bored.
9. Wiped.
10. Front end cleaned and polished or painted.
11. Fires built.
12. Supplies handled.
13. Miscellaneous.

Direct labor and material is allocated to each class of work. The overhead such as foremen, and general laborers sweeping and cleaning is apportioned to each class of work on the basis of direct labor charge, a report being made for each enginehouse.

Whether a division of enginehouse expenses in such detail should be used is a matter for each carrier to decide. Occasionally a situation arises when conditions demand thorough study but when corrective measures have been applied, and improvements are apparent, details may be curtailed.

2. The general practice is that engines are counted but once, some when the engines are dispatched, and some when the engines move over the clinker pit inbound. A few use an arbitrary, as for example, a train locomotive is counted once for each departure, a switch locomotive is counted once for each single crewed locomotive; twice for a double crewed locomotive and thrice for each triple crewed locomotive; but the switch engine is not counted when coming in for water, coal or small repairs unless it goes over the table and is handled by the round-house force.

Some reduce handling to units, that is, so many units represent fueled, watered and sanded, a different number for turned on table; and still another different number for fires cleaned, etc.; all of these units calculated on the basis of the class of power; light, medium or heavy.

The count is separated between passenger, freight, switch, etc., according to kind of service the locomotives are engaged in, for the purpose of dividing the expense between classes of service.

3. Your committee cannot recommend a uniform method for counting locomotives for the reason that the conditions on each carrier's lines are different even to the extent of being different at several points on one railroad; but it matters very little what unit is used to determine the cost providing the count is conducted the same way year after year at each enginehouse, and the count is understood by those analyzing the costs.

Reporting of Time Returns, and Labor and Material Distribu-

tions for Maintenance of Way Department. The committee recommended a plan of daily reports which, it said, has been found to be workable in actual practice, and which gives the necessary information for accounting purposes and prompt preparation of payrolls at a minimum of expense consistent with surrounding the expenditures for both labor and material with the proper safeguards.

Accounting for Improvements or Betterments to Units of Equipment. The committee developed a plan intended to account properly for improvements or betterments to units of equipment in order that correct accounting may be accomplished properly segregating the cost as between additions and betterments and operating expenses; and in this plan it essayed to put the best possible safeguards against improvements being made to equipment and the cost thereof being charged to operating expenses when the improvements are of a minor nature.

Accounting for Car Repairs. The committee reported as follows:

A study has been made of the plan of having "original record of repairs" and "billing repair cards" made by one writing, and it is the opinion of your committee that it is practical, and is not in conflict with A. R. A. rules.

At the present time on the majority of railroads the making of the "original record of repairs" and "billing repair cards" are separate operations and in many cases the work is done by different employees. In some cases the "original record of repairs" are sent to a central bureau where the "billing repair cards" are written—in others, the "billing repair cards" are made in district offices—while in others, cards are written by the foreman who made the original record of repairs, or by his clerk or one of his workmen.

All of the information for making the "billing repair cards" is required to be shown on the "original record of repairs" and it therefore seems logical that the two should be made by one writing through the use of carbon paper. (It is estimated that the number of "original records of repairs" made is between 40,000,000 and 50,000,000 per year and this same number of billing repair cards are being separately written from the information shown on the "original record of repairs.")

If the plan should be adopted the services of the clerical employees in central and district offices who now write the billing repair cards from the "original record of repairs" could be dispensed with, although it is your committee's belief that some of this clerical force would be required, particularly at heavy repair stations. If their services were required, the experience in car repair matters that they would obtain by assisting in writing of the original record of repairs and the completion of the record when the repairs were finished at the point where the work is actually going on would be valuable and they would acquire a knowledge of car repair work much more quickly than they do when located in central or district billing offices. Your committee believes this is an advantage that should be taken notice of, aside from the apparent saving in clerical forces that would be accomplished by making the "record of repairs" and the "billing repair cards" at one writing.

Your committee, recognizing that the plan of making "original record of repairs" and "billing repair cards" at one writing is in effect only at a few locations, recommends this report be treated as a progress report and that the subject be continued on the docket of your committee on disbursement accounts, so further time may be devoted to it.

Other Reports

The committee on R. A. O. A. overcharge and agency relief claim rules, J. W. White, auditor freight accounts, Oregon-Washington Railway & Navigation Company, chairman, reported that it had two meetings during the year for a total of five days. It reported on 49 subjects and among the important actions taken was the joining with the freight accounts committee with reference to the harmonizing of overcharge rules and freight accounting rules.

The committee on valuation, F. C. Sharood, assistant general auditor of the Northern Pacific, chairman, pointed out the importance of valuation to the accounting officers. He showed that valuation is now of importance with reference to the fixing of rates, recapture, the issuance of securities, etc. He joined with several of the other committee chairmen in suggesting that more subjects might be referred to the respective committees. He quoted one statement that had been made to him to the effect that although the valuation act had been passed in 1913, the accounting officers had as yet hardly taken official notice of the fact.

The committee on statistics, A. L. Conrad, assistant general auditor of the Atchison, Topeka & Santa Fe, chairman, reported on five subjects, one of which was a proposal for monthly statements showing man-hours by operating expense accounts.

W. A. Meglemery, auditor passenger accounts of the Louisville & Nashville, presented an interesting report as chairman of the committee for conference with the American Association of Passenger Traffic Officers. He had finally interested that association in the matter of simplified passenger fare divisions, he said. A sub-committee had been appointed by the passenger officers and greater co-operation could probably be expected between the two associations in the future.

Other Business

A constitutional amendment to increase the membership of the committee on terminal accounts from 9 to 15 was adopted after considerable discussion, it being pointed out that while the committee reported this year on only four subjects, its meetings offered opportunity for the discussion and interchange of many ideas which did not appear in the committee's report.

Another amendment covering the establishment of associate memberships to take the place of the present honorary membership received considerable discussion but was finally referred back to the executive committee for further consideration.

Election of Officers

Officers were elected for the ensuing year as follows:

President, W. C. Wishart, comptroller of the New York Central; first vice-president, G. E. Bissonnet, general auditor, Union Pacific; second vice-president, E. H. Kemper, comptroller Southern Railway; secretary, E. R. Woodson.

New members of the executive committee were elected as follows:

William C. Carrick, general auditor, Richmond, Fredericksburg & Potomac; T. O. Edwards, general auditor, Southern Pacific; W. B. McKinstry, comptroller, Central of Georgia.

The convention voted to meet next year at Quebec, the second Tuesday in June.



P. & A.

Electric Operation on Staten Island Rapid Transit Began on June 5

Electric Train and Steam Locomotive Side by Side at Terminal, St. George, Richmond, N. Y. City.

Freight Car Loading

WASHINGTON, D. C.

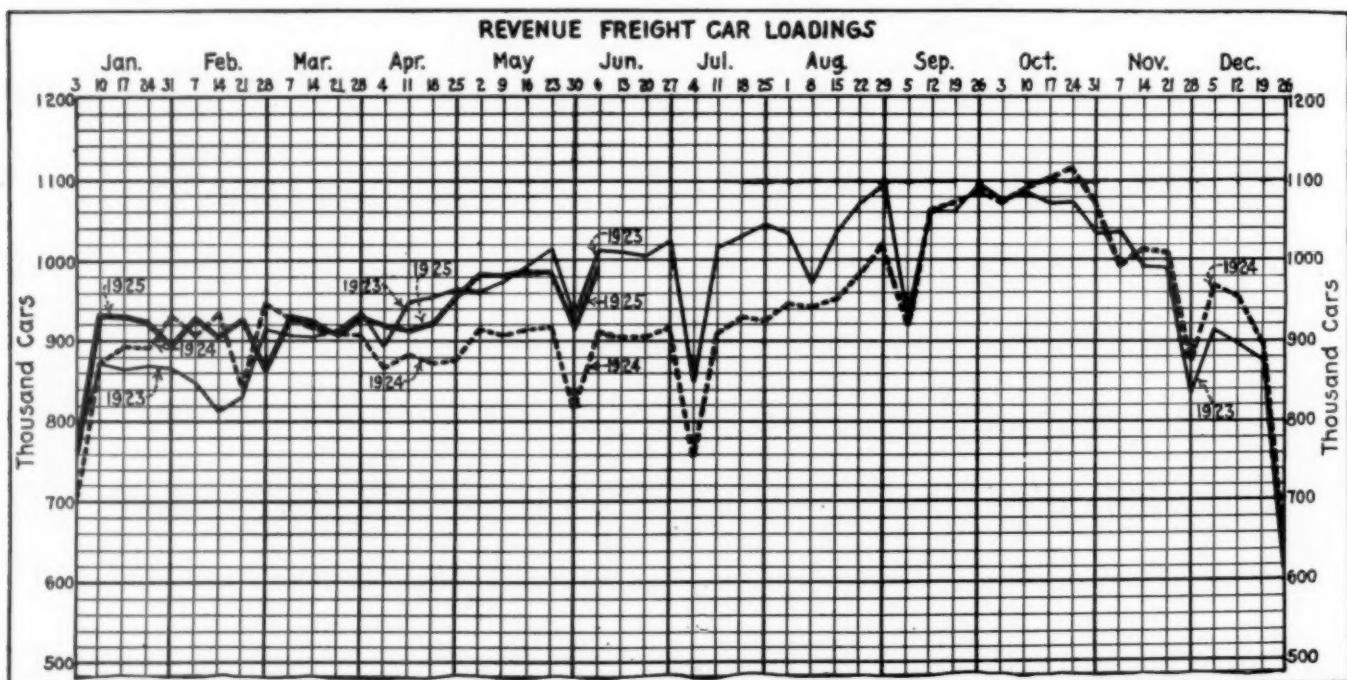
REVENUE freight car loading in the week ended June 6 totaled 994,874 cars, the highest figure reached during any week this year and an increase of 84,081 cars as compared with the corresponding week of last year, although it was a reduction of 17,438 cars as compared with 1923. However, the loading for 23 weeks of this year is still slightly ahead of that for the corresponding period of any previous year. Increases as compared with last year were shown in all districts and in all classes of commodities except grain and grain products and livestock, but in the Eastern, Allegheny and Northwestern districts, and in livestock, coal, coke and ore, the loading was less than in 1923. Coal loading showed an increase of 8,216 cars as compared with last year, forest products an increase of 8,503 cars, merchan-

140,676 box cars. The Canadian roads for the same period had a surplus of 35,890 cars, including 31,825 box cars.

Car Loading in Canada

Revenue car loading at stations in Canada for the week ended June 6 totalled 49,719 cars, an increase over the previous week of 3,617 cars. Grain and grain products increased 354 cars, coal 301 cars, lumber 687 cars, merchandise 1,575 cars, and miscellaneous freight 941 cars, while other commodities showed little change. Compared with the same week last year the total showed a decrease of 8,775 cars.

Commodities	Total for Canada			Cumulative totals to date	
	June 6, 1925	May 30, 1925	June 7, 1924	1925	1924
Grain and grain products.....	4,274	3,920	10,600	136,825	188,428
Livestock	1,965	2,044	2,137	50,488	50,143
Coal	1,690	1,389	4,750	88,102	110,441
Coke	222	416	176	6,680	5,577



dise an increase of 17,094 cars and miscellaneous freight an increase of 48,476 cars. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

REVENUE FREIGHT CAR LOADING
Week Ended Saturday, June 6, 1925.

Districts	1925	1924	1923
Eastern	234,682	216,189	251,885
Allegheny	199,060	187,821	226,183
Pocahontas	50,833	40,670	41,786
Southern	143,109	126,256	132,602
Northwestern	159,264	148,359	166,633
Central Western	140,200	134,808	136,815
Southwestern	67,726	56,690	56,408
Total Western	367,190	339,857	359,856
Commodities			
Grain and grain products.....	37,792	39,145	34,409
Livestock	27,272	30,877	31,953
Coal	151,566	143,350	189,765
Coke	9,218	7,916	14,870
Forest products	77,926	69,423	76,385
Ore	66,276	60,828	76,088
Mds., I. c. l.	238,398	241,304	242,710
Miscellaneous	366,426	317,950	346,132
Total	994,874	910,793	1,012,312
May 30.....	920,514	820,551	932,684
May 23.....	986,209	918,224	1,015,532
May 16.....	984,916	913,201	992,319
May 9.....	981,370	908,203	974,741
Cumulative total, 23 weeks.....	21,336,491	20,470,763	20,970,211

The freight car surplus for the period May 23 to 31 averaged 323,624 cars, including 133,559 coal cars and

Lumber	4,355	3,668	3,947	75,228	81,303
Pulpwood	2,074	2,099	2,089	73,509	75,807
Pulp and paper.....	2,012	2,026	1,919	48,038	47,804
Other forest products.....	2,638	2,587	2,633	68,657	65,337
Ore	1,661	1,641	1,938	28,585	25,007
Merchandise L.C.L.....	15,623	14,048	15,529	338,740	316,842
Miscellaneous	13,205	12,264	12,776	251,490	254,547
Total cars loaded.....	49,719	46,102	58,494	1,166,342	1,221,231
Total cars received from connections	30,821	33,386	27,528	760,019	769,211

HARRY WATSON, an employee of the government-owned Alaska Railroad, will either have to resign as a representative in the Alaskan territorial legislature or have his name stricken from the rolls as a government employee, according to a decision of the Secretary of the Interior Department. Secretary Work's decision was based on an executive order issued by the President on January 17, 1873, providing that persons holding any federal civil office by appointment will be expected not to accept or hold any office under any state, territorial or municipal government. The act of August 24, 1912, creating the legislative assembly in the Territory of Alaska also expressly provides that no person holding a commission or appointment under the United States shall be a member of the legislature or shall hold any office under the government of the territory.

Warren Stone, B. of L. E. Head, Dies

Enginemen's president strengthened organization and then made it a financial power

WARREN S. STONE, president of the Brotherhood of Locomotive Engineers and of its various banking, investment and industrial enterprises, died in a hospital at Cleveland, Ohio, on June 12, from an acute attack of Bright's disease. Mr. Stone had but recently reassumed his duties after a period of illness of several weeks' duration.

Mr. Stone became grand chief engineer of the Brotherhood of Locomotive Engineers in 1903 and served in that capacity until recently when, with the multiplication of the organization's financial and industrial undertakings, a reorganization was brought about, which placed Mr. Stone with the title of president in general charge of all the union's activities, leaving the labor activities to a newly elected grand chief engineer.

Mr. Stone at the beginning of his career as a labor leader set out to increase the power and prestige of his organization and his effort was highly successful. Under his administration the membership increased from 38,000 to 90,000—and this without any effort to enforce the closed shop. Insurance carried by members in the brotherhood mounted from less than \$70,000,000 to over \$200,000,000. And since 1920, when the engineers' first bank in Cleveland was opened, the brotherhood, or its members acting through subsidiary corporations, has acquired control—or at least sufficiently large enough interests virtually to constitute control—in financial and industrial corporations with assets approximating \$150,000,000. Most of these are co-operative banks or investment corporations organized by the brotherhood. In addition, however, there is a large holding in the Empire Trust Company of New York, which controls the Equitable Building in that city; and the brotherhood has two buildings in Cleveland, one valued at \$6,000,000 and the other at \$3,000,000.

Judged, therefore, by the usual standards of estimating leadership—i.e., the increase in power, wealth and prestige of the organization of which he was in charge—Mr. Stone's career was all that could have been wished for it. Yet he had his critics, and indeed more than once the *Railway Age* found itself among them, for all its admiration of his many good qualities and successful leadership. Perhaps the most acrimonious of all the disputes which arose around his activities was his recent one with the miners' union relative to the unionization of coal mines owned by a subsidiary corporation of the brotherhood. In

this dispute Mr. Stone maintained, what was doubtless the truth, that the mines could not meet the union conditions and continue to operate. So, rather than close down, he made a scale at which operations could be carried on at a profit. This naturally brought objections from the miners' union and Mr. Stone was accused of being no real unionist at heart but an opportunist who was seeking only power. If the union point of view suited his ends he would use it. But if the capitalist's attitude suited him better, he would adopt that.

Yet in extenuation of Mr. Stone's opportunism, if the charge be true, it may be pointed out that the entire labor movement in this country has been largely so characterized. And in its early stages of development probably opportunism is necessary to existence. The only criticism of the viewpoint, therefore, arises when it is maintained as policy after a union has a foothold in industry which makes it no longer necessary. In one or two places it now appears that a different attitude is gaining headway in some of the unions. Mr. Stone himself gave verbal recognition to the change in pointing out in a recent interview in "Labor" the stages of union development from a period of strife to a period of co-operation with management. But Mr. Stone's accomplishment in bringing additional power, prestige and wealth to his organization so far surpassed the accomplishment of any other labor leader in

a similar field, that it would perhaps be too much to expect that he should have at the same time similarly enriched the labor movement in its social and economic outlook as well. Indeed, there are many capable observers who are of the opinion that the increasing excursion of the unions into capitalistic enterprise will bring this improved social and economic outlook in its wake without their formal "conversion" to a new faith being necessary. If this prediction proves true, society will owe the change largely to Warren Stone. His organization was not the first in the field, to be sure, but it certainly was the first to demonstrate the really vast possibilities open here to labor organizations.

For the rest, Mr. Stone was, generally speaking, conservative and dependable. Under his leadership the brotherhood never engaged in a strike except on a few isolated roads. There were times, of course, when strikes were near and when his part in them brought much condemnation—particularly when "the stop-watch was held



Warren S. Stone

on Congress" at the time of the passage of the Adamson act. However, when the strike was threatened in 1921, he showed the wisdom, along with the other "big four" brotherhood leaders, to moderate his policy; and the country was saved the consequences of a strike which would likely have been much more troublesome than that brought on in the following year by other leaders less wisely advised.

Warren Stanford Stone was born on a farm near Ainsworth, Iowa, on February 1, 1860, and entered railway service in 1879 as a locomotive fireman on the Chicago, Rock Island & Pacific at Eldon, Iowa. Five years later he was promoted to engineman, in which capacity he served for almost twenty years prior to his election to the head of his brotherhood. All his life he has been known as a tireless worker. A story is told that a Cleveland newspaper man who goes to work on an early shift reports that he frequently saw Mr. Stone having his breakfast at 5 a.m. in a "one-arm" lunch-room prior to starting his day's work. At the funeral in Cleveland one of Mr. Stone's brothers told of advising him when he was ill a few weeks ago to lighten his work. "I believe that I'd rather go out under a full head of steam," Mr. Stone replied. And he went out that way.

Wire Communication on the Pennsylvania

AN interesting circular has been issued by the Pennsylvania Railroad describing its telephone and telegraph system. It says that the Pennsylvania was the first railroad to use the telephone. It appears that Alexander Graham Bell sent his associates, Gardiner G. Hubbard and Thomas A. Watson, to Altoona on May 21, 1877, to experiment with the telephone in the railroad company's shops in that city.

A total of 98,494,000 local and 17,514,000 long distance telephone messages are transmitted over the company's wires yearly, in addition to 32,000,000 telegraphic messages; and these figures do not include train dispatching and kindred activities.

On the entire system, over 300,000 telephone instruments are in service. The company utilizes 10,260 miles of pole line, 232 miles of underground conduit, 928 miles of lead-sheathed cable, and 126,921 miles of wire. A total of 180 railroad private branch telephone exchanges are required to handle the Pennsylvania's telephone traffic. One of these, that at the general offices in Philadelphia, is the largest railroad private branch in the world.

Supplementing the above summary, the pamphlet says that the trunk telephone circuits in service aggregate 22,545 miles, connecting the 180 branch exchanges. The exchanges employ a total force of 750 operators. The exchange in the general office at Philadelphia controls 890 circuits besides six additional for long distance communication, and 99 leading to other exchanges. In 1924 this general-office exchange handled 7,142,116 calls, including over 1,000,000 long distance connections. This work employed the services of 40 operators. In the Philadelphia district the road has 24 private branch exchanges.

At Altoona the company's exchange connects with 2,548 telephones, of which about two-thirds are used for calling trainmen for their runs. These instruments are installed in homes scattered throughout Altoona, Hollidaysburg and Juniata. The company has a large exchange at Pittsburgh and others at New York, Harrisburg, Chicago, Jersey City and St. Louis. At New York, Philadelphia and Pittsburgh there is an entirely separate private branch

exchange system to attend to telephone requests for information about passenger trains. At New York City 12 operators are kept busy answering travelers' questions and they handle 1,300,000 calls in a year. There is a smaller corps of operators in Philadelphia. Here, in a busy day, they have answered 5,000 calls.

In the principal terminals the telephone exchanges are connected to a car, in each of the more important limited express trains, during the time after the train has been made up and before it starts.

In the larger cities the stations have booths in waiting rooms, giving to the public 24-hour telephone service; and New York and Philadelphia together have 322 instruments for this service.

Train dispatching throughout the Pennsylvania System is now done in substantially all cases by telephone, the first instrument in this service having been on the South Fork branch in December, 1897. The dispatching wire system on the Maryland division is described in some detail. On this division, 95 miles long, with several short branches, there are four dispatchers on duty at all times, the division being divided into four sections. Some of the dispatchers have earphones, wearing them continuously, and others use loud-speaking receivers. Besides the dispatcher's circuit there is a message circuit which, on the Maryland division keeps three operators employed (at headquarters Wilmington, Del.); and besides this there is a general talking circuit leading from headquarters to the principal stations, towers, enginehouses, etc. At terminals there are independent telephone circuits.

Telephones mounted in outdoor boxes along the line of the road are to be found usually at intervals of less than one mile over the entire 10,464 miles of the Pennsylvania lines. These telephones, for the benefit of track foremen, signal maintainers, delayed freight trains, etc., connect in each case with the nearest signal station or tower. The signalman can connect through to the dispatcher when necessary. About 1,000 gasoline "track cars" are now used by repair men and others on the Pennsylvania, and each one of these cars has a telephone with fish-pole connection for attaching to overhead wires.

On the important parts of the Pennsylvania System there are telegraph lines on both sides of the roadway, an arrangement which diminishes the chances of interruption by damage to wires or poles. The Maryland division uses over 900 telephone instruments and 3,358 miles of wire.

Special telephone exchanges for large shops, etc., also constitute a considerable element in the company's electrical plant. The Philadelphia Terminal division, for example, has an automatic dial telephone system, established in 1917, supplementing the ordinary telephone facilities; and the automatics accommodate 160 "stations." There are 11 other such systems at important points of which seven are automatically operated.

Of all wires about three-fourths are available for simultaneous telegraph and telephone use.

The Morse telegraph is still available at 2,420 block stations, relay offices and other places, of which 88 are busy telegraph offices. The largest telegraph office is PO, at the general offices in Philadelphia, from which go out 48 through telegraph circuits. This office has four duplicate printing machines; they work 15 hours a day, two of them running to Pittsburgh and one to Harrisburg; the fourth is for emergency use. These printers handle 1,800 messages a day. Printers are also in use from Pittsburgh to Chicago, Pittsburgh to Cleveland, Pittsburgh to Columbus and Pittsburgh to Indianapolis. About 8,000 messages a day is the average at PO.

The telautograph is in use at Philadelphia, (five transmitting machines) and at New York, Harrisburg, Wilmington, Baltimore, Altoona and Pittsburgh.

Superintendents Meet at Richmond

Operating efficiency—Truck competition and public relations, among interesting topics

THE thirty-second annual convention of the American Association of Railroad Superintendents, which was held at Richmond, Va., on June 16-19, was largely attended and actively participated in by general superintendents, division superintendents, trainmasters and chief dispatchers from all parts of the United States and Canada. The reports presented during the four days concerned such topics of universal interest to operating men as operating statistics, loss and damage to freight, embargoes, branch line service, bus competition, public relations, train tonnages, distribution of freight cars, movement of empty cars, increasing loads per car and daily average mileage per car, grade crossing accidents, better fuel performance and train rules. E. H. Harman, assistant to general manager, Terminal Railroad Association of St. Louis, and president of the association, presided at the sessions of the convention.

The annual dinner on Wednesday evening was attended by more than five hundred members and their families. Hon. James C. Davis, director-general of railroads, and C. H. Stein, general manager of the Central of New Jersey, were the speakers at the dinner.

The following officers who will serve during the ensuing year were elected at the close of the convention:

President—E. H. Harman, asst. to general manager, T. R. R. A. of St. L., St. Louis, Mo., re-elected; first vice-president—G. O. Brophy, superintendent, U. P., Kansas City, Mo., re-elected; second vice-president—J. M. Walsh, superintendent, Y. & M. V., Memphis, Tenn., re-elected; secretary-treasurer—J. Rothschild, Union Station, St. Louis, Mo., re-elected. Members of the Executive Committee—Charles Burlingame, chairman, superintendent, T. R. R. A. of St. L., St. Louis, Mo.; B. B. Tolson, superintendent, M. & O., Murphysboro, Ill.; W. S. Williams, general superintendent, I. C., Waterloo, Iowa; J. K. D. Brown, asst. superintendent, N. Y. C., Buffalo, N. Y.; W. F. Eckert, superintendent, Reading, Philadelphia, Pa.; Victor Parvin, superintendent, Ann Arbor, Owosso, Mich.; and T. J. Jones, general superintendent,

Wabash, St. Louis, Mo., all the old officers re-elected.

At the opening of the convention, the members were welcomed on behalf of the railroads entering Richmond by W. J. Harahan, president of the Chesapeake & Ohio. Mr. Harahan urged the superintendents to give close and extended consideration to furthering co-operation between themselves and their employees. This could best be done, he said, by means of encouragement of the initiative and originality of the men and by giving them opportunity to develop themselves through participation or attendance at as many meetings as possible where problems affecting the railways are discussed. Mr. Harahan suggested that the superintendents aid in public relations work by acquainting themselves with as many of their patrons as possible, so that mutual discussion of problems affecting the railways and shippers might be discussed as friends rather than as strangers.

In his report, President Harman referred to the rapid growth of the association and the stimulation of enthusiasm among its members. He offered a number of suggestions for the future procedure of the association which would tend to turn its efforts into directions in which it might be of greatest value to North American railways. Referring to the fact that superintendents of transportation and chief dispatchers are now eligible for membership in the association, he proposed that membership be further extended to general yard-masters and road foremen of engines. Mr. Harman also suggested that the ambiguous names of the standing committees be changed so as to indicate that they are all actively engaged in the study of problems of railway operation. This could be done, he said, by renaming the committees as Operating Committees as well as committees with duties suggested by their present names; thus, the Executive Committee would be Operating Committee No. 1 and Executive Committee, the Nominating Committee would become Operating Committee No. 2 and Nominating Committee, and so forth. These suggestions were referred to the Executive Committee for report.

Report on Operating Statistics

A report on desirable operating statistics for superintendents was presented by a committee of which F. W. Brown, assistant to the general manager, Atlantic Coast Line, was chairman. An abstract of the report follows:

A prime requisite for all operating statistics is that they be compiled and placed at the superintendent's command with the least possible delay. Certain telegraphic reports, it would appear, are needed by all superintendents. Such reports should be compiled twice daily, preferably as of 6 a. m. and 6 p. m. Some superintendents also require a daily telegraphic report of the supply of coal at the various coaling points, showing tons on hand and tons used. This is of particular value where a monthly budget is in effect, or where the supply is ordered currently and an effort made to keep the amount on hand as low as current needs make possible.

A daily telegraphic report of bad order cars is also of value, particularly in time of car shortage. Other tele-

graphic reports, too numerous to attempt to enumerate here, are required by superintendents to suit their varying operating conditions.

Other daily reports that should be compiled and placed before the superintendent as quickly as possible refer to road and yard operation. The information for the former can be prepared readily from train sheets and dispatchers' records and should be comparative with the same day last year and last month. More complete information relating to the performance of freight trains can be prepared with little, if any, additional expense by the car record offices in a form of weekly or period reports during each current month from the statistics which they are already compiling for the Interstate Commerce Commission. These statistics include gross ton miles and speed of trains, with a segregation between through and local freights, and are secured from the conductors' wheel reports. If these data are given the superintendents currently for several periods

during each month, they will not be more than seven or eight days behind actual operation and will serve as a reliable forecast of the month's complete operation.

The yard operation report should be made comparable with the last year, and the last month, and should show reasons for any fluctuations in expense either upward or downward, while the matter is fresh in the mind of the general yardmaster or terminal officer responsible.

Where divisional operation obtains, certain members of this committee working under this system recommend daily, weekly and monthly statements of the cost and nature of car repairs, maintenance of way work and bridge and building repairs and improvements.

The report was adopted by the convention with the understanding, however, that copies of it would be submitted to each one of the regional advisory boards for their consideration.

On the question of the turning of engines, the committee stated that economies will result from less frequent turning of engines but that road engines should not be kept out of enginehouses after more than 200 miles of continuous service and switch engines, not after 16 hours of continuous performance. Economies result from fewer turnings because of fuel saving and less handling and because congestion is diminished and engines are in position for service with greater speed.

Prevention of Loss and Damage to Freight

The committee also submitted as its report on the subject an article by W. H. Wright, superintendent, Central of Georgia, of which the following is an abstract.

The question of improper loading and stowing has been handled with marked results. There is still room for improvement, however. This must be worked out in warehouses. In order not to drift back where we were five years ago, meetings in the warehouses with the agents, warehouse foremen, stevedores, and truckers, should be held regularly, suggestions continually invited, and the subject kept uppermost in their minds at all times. We are getting new commodities from time to time, shipped in various kinds of packages, which in some cases require new methods of loading and stowing. These matters should be given careful thought, and should be the subjects of discussion on the part of the warehouse forces, and the best possible methods of handling adopted.

Loss of entire package is still costing carriers entirely too much money. If a box of goods is properly marked, received, loaded, unloaded, at destination, delivered to consignee, and a receipt taken and properly preserved, the box cannot be lost. However, every year the railroads are paying thousands of dollars for loss of entire packages. Carriers should continue to give this subject close attention. The slogan should always be "Check Freight and Load it Right."

The railroads' annual bill on perishable freight is enormous. During recent years fruits and vegetables have become more infected with various pests and diseases. Certain spray treatments are necessary to combat these evils. The evils themselves, combined with the treatment necessary, have resulted in poor carrying quality of many commodities moving under ventilation or refrigeration. Whenever perishable goods fail to arrive at destination in good condition, carriers are almost invariably presented with a claim. The question of icing is also very important.

Rough handling of cars is the biggest problem before carriers today. Investigations conducted by several lines, under varying conditions, show that 90 to 95 per cent of the rough handling of cars occurs in the yards. There-

fore, when we know where this rough handling occurs, we know where to start out to correct it.

The equipment should be in good condition. Locomotive brake equipment and air and hand brake equipment on cars should be properly maintained. Stress should be laid on the importance of proper signals. It has been found that good results have been obtained by eliminating switching with long cuts of cars. However, many of us in this meeting know about what should be done in all of these matters. Our job consists of educating yard forces, especially new employees, and getting their co-operation in this great work.

On the question of the cleaning of cars after release from lading, the committee said that unloaders of equipment should be charged with the thorough cleaning of all cars unloaded. Personal calls upon consignees are necessary to secure their co-operation. It was pointed out that industries would be entitled to expect the railroads to provide just as clean cars for outbound shipments.

Discussion

This report was followed by an extended discussion of ways in which losses and damage to freight can be reduced. The use of impact registers in test cars to determine the degree of impact to the cars was recommended by J. M. Walsh, Y. & M. V., and others. Mr. Walsh also urged the installation of hump yards wherever possible in place of flat yards in order to reduce damage from rough switching. Corroborating Mr. Walsh's approval of hump yards, G. J. Shreeve, Belt Ry. of Chicago, reported that on his road, there have been no instances of rough handling, as disclosed by impact recorders, in the large hump yard. There has been rough handling in flat yards, however, he said. He referred to the use of mechanical retarders in the hump yard of the Indiana Harbor Belt which he said had proved a great success. In this yard, since the installation of the retarders, damage to freight has been reduced 90 per cent while personal injuries have been entirely eliminated. The report was adopted by the convention.

Accelerating Train Movements

B. H. Mann, signal engineer of the Missouri Pacific, in a paper on "Means of accelerating freight train movements," urged the more extensive use of lengthened sidings rather than continuous double track, in territory where sidings may perform the work necessary, on account of the greatly reduced capital expenditure involved in less expensive improvements. Mr. Mann's paper is abstracted below.

As to the net earning power of the plant as a whole, the entire burden of the capital charge and operating expense must be balanced by the receipts from the production of ton-miles and passenger miles. A single track structure will be, under similar conditions, a much less capital charge burden than a multiple track line.

Gross ton-mile efficiency rests, in part, upon train-hours and not solely upon track-miles. Therefore "miles per

hour" enters largely into the problem and "double track" or its equivalent, become merely means to an end.

Such being the case, double track drops from a prime requisite on a single track railroad to a subordinate position immediately upon being displaced by some other factor producing a satisfactory acceleration of the train at a less first cost.

Actual extensive check of the average work on many and widely separated single track freight train sub-divisions has proven to me that the percentage which the idle time at stations bears to the total train trip, "time called" to "time tied up," varies from 28 per cent to 44 per cent. This is too much waste and can usually be corrected by a relatively small expenditure of money for physical improvements if the latter are supported by scientific operation.

The second part of the train trip is the fit subject for scrutiny and the 28 per cent to 44 per cent of idle time at stations is a fruitful field for study by any management, particularly, as this loss may vary from \$15.00 to \$25.00 per hour in direct expense and from \$50.00 to \$100.00 per hour in potential gross earnings.

The question of continuous stretches of double track versus something else, in an attempt to increase the production of gross ton-miles per train-hour by the acceleration of the ordinary single track freight train, is before us. Through long years the best railroad minds were conversant with the large increase in track capacity which followed the building of continuous double track. The ratio of the capacity of a single track sub-division with a spacing of sidings five or six miles apart to a capacity of the same sub-division, double tracked, has been said to be as one to five or six. But why take such a big jump? Double track is the ultimate aim. The sole question at issue is whether it shall be built in continuous stretches. A decision should first be reached as to just what increase in traffic capacity is required. The freight train trip must be studied and the plant fitted to the peak load in a rational way. It must be borne in mind that the peak load lasts but for three or four months in the year and its three or four months earnings must carry the interest charge on the extra capital invested for the entire twelve months. The additions and betterments must be tempered to a peak load saving of 18 per cent to 24 per cent to carry the annual interest charge of 6 per cent.

Somewhere a mark must be set as unity or 100 per cent for the "miles per hour" sub-division freight train trip movement. This appears reasonable and practicable at 12½ miles per hour, "time called" to "time tied up."

The reduction of idle train time, station by station, offers one field for increase of track capacity and another is offered by such an added length of sidings as will permit an increase of the gross tons per train in the ruling direction when "in to clear" to the proper ratio to the drawbar pull.

The average delay at one station may be ten minutes, at another six minutes, and at a third three minutes. Good transportation judgment calls first for a capital expenditure to bring the ten minute average down to six and then possibly the six minute average down to three but no good reason can be offered for building second track at the station where now the low average of three minutes delay is experienced merely because this station happens to be at the end of an existing stretch of continuous double track.

There is no sound reason for an expenditure of \$300,000.00 on a freight train sub-division for six miles of continuous second track when the same expenditure scattered will save two or three times the average train delay and thereby put immediately every dollar expended into its earning power in the same increased ratio.

Almost as often can it be developed that the sole cause of the congestion in entering the space between the stations on the gradient is the excessive time interval needed for a train to move from one of these stations "in to clear" at the next. It follows that if the sidings at one or both ends of the adverse station spacing on the adverse gradient may be extended so that the "time to make" the next siding may be reduced to equal or less than that required "to make a siding" in the favorable station spacing, then traffic requirements have been met and every foot of additional second track built at this point is nothing else than plowing in betterments, not for immediate traffic demands but for some possible later and deferred need. At the same time, some other location may present a call based upon a greater current train interference.

If the gross ton-miles per train-hour for any section of freight train sub-division is low, some means should be taken to strengthen this weaker link in the chain, particularly if it ranks lowest on the entire sub-division.

Begien Discusses Personnel

R. N. Begien, vice-president of the Chesapeake & Ohio, had prepared a paper on "Employment of Men and Personnel" which was read on Wednesday morning by G. D. Brooke, C. & O. The following is an abstract of Mr. Begien's paper:

If we are to work to a common understanding there must be a head who creates standards of accomplishment. With proper standards established they must be promulgated in such a way that all members of the staff and employees must know what they are in order that they may be carried out. Imperfectly organized transmission of instructions from top to bottom is responsible for a great deal of the absence of co-operation.

What will gain the co-operation of men and officers?

1. Fair and courteous treatment.
2. Safe and healthful working conditions.
3. Steady work with reasonable hours.
4. Regular wages, received regularly so that they can be depended upon.
5. A good boss that men respect.
6. A hearing before discipline.
7. Provision for old age by pension or insurance.
8. Recreation and consideration of family.
9. Information with regard to what the road

is trying to accomplish and the results being obtained.

10. Chance for advancement.

All of these requisites must be administered in accordance with the standards set up by the head. There must be a constant supervision to determine whether these standards are being followed, both among officers and men, and there is much to be gained by the interchange of thought between officers and men through their meeting in joint committees, which will discuss problems and methods of procedure and make suggestions for betterment of the service and improved relations between the employees and their officers.

A railroad officer is not an officer by "Divine Right"; 99½ per cent of them are men but a few years removed from the ranks, to whom has been entrusted the direction of a certain number of employees in order that all the employees may devote their energies toward a common end. An officer, therefore, having the point of view of the man and understanding exactly how he feels, should meet with but little difficulty in maintaining perfect co-operation with the men of the rank and file. Again, since

the officer has come from the ranks, the man who works under the direction of that officer understands his chief and should have no hesitancy about discussing matters with him in a language known to them both. So with a common understanding and a common incentive, it would seem that the conditions and environment are particularly favorable for the fullest measure of co-operation on our railroads. There remains only the perfecting of the organization to bring it about.

It is perfectly evident that if a man understands the point of view of his officer and the officer understands the point of view of the man, but they never talk matters over, there is but little opportunity to bring about the action which would accomplish what they both want. There must, therefore, be some sort of an organization consisting of representatives from the officers and the men which will meet at certain specified times and places to exchange ideas. These ideas when meritorious must then be submitted in due form to proper officers for execution, or should there be good reasons why they cannot be carried out such reasons should be fully understood.

There are already certain points of contact—the safety committees are a notable example of this. We are all aware of the great good that has been done through safety work and the record of this accomplishment is of great credit to the employees, as well as to the management, of the railroads of the United States. There is also contact through the fire prevention meetings and loss and damage meetings.

While some employees and their representatives have

advanced ideas as to the relations between employer and employee, it usually remains for the managing officers to make the suggestion and encourage the men to active participation in the co-operative movement. The officers being well acquainted with the employees will have no difficulty in presenting the problem to the men and in obtaining their support during the early period of forming and perfecting the committees and other co-operative machinery. It is a most encouraging sign that the officers of the employee brotherhoods, some of them men of high position, are thinking seriously along these lines today. They understand to what extent the interests of employees is dependent upon the success of the railroads and are receptive and even suggestive of co-operative plans.

A railroad is a highly organized machine. The failure of any part of this machine to function properly means a consequential reduction in output. These dependent sequences cannot be maintained at high efficiency without the most enthusiastic co-operation on the part of all employees and officers alike. On the other hand, if this co-operation is maintained all the way through the organization it means a more successful outcome, and the railroad becomes more prosperous. With that prosperity it is enabled to eliminate the high and low spots in the expenditures and to plan a program of work which is steady from month to month, maintaining a constant force, without following arbitrarily the ups and downs of business. Through this process the men receive the most desirable reward and the one that they prize the most, namely, steady work.

Public Relations and Advisory Boards

Division officers may profit from the activities of the Shippers' Regional Advisory Board movements by carefully analyzing the anticipated requirements of the various industries. We have established a strong bond between the shipper and the railroad. It is our belief that a similar bond should also be established between the railroad and the traveling public. The problem presents greater difficulties. We cannot expect the creation of regional boards among the traveling public. In the case of the regional board, we resort to the expedient of mass or group action; in the case of the traveling public, we can only reach one individual at a time. There is room for much work in this particular field. The traveling public may be cultivated in a similar manner and with mutual benefit.

Various methods have been tried and are being used. There is, of course, and above all, the newspaper and magazine medium. Certain railroads have their own publications which are doing good work along these lines. One well-known line uses two expedients which, we believe, are serving to enlighten the people. One of these expedients is a monthly poster, which is prepared by the

president or general manager, and which hangs in all coaches and stations. These posters, which are necessarily brief and in large type, discuss frankly the current railroad problem each month. They can be read in a few moments and they have attracted wide attention. They have been issued for nearly two years and every one of them has been reproduced in some of the principal daily newspapers, because of the timeliness of the message they carry.

The other expedient, which this road uses, is a pamphlet entitled, "____ Railroad Service," which is now running into the eleventh year of continuous publication. It appears monthly and is distributed at the stations and in the coaches by means of "Take One" boxes, besides being sent out to an extensive mailing list. This publication carries articles of general interest to the traveling public and the shippers, and has been found a good medium of contact between the railways and these two elements. It is distinct from the ordinary railroad magazine, which contains primarily articles of pertinent interest to the employees and their families.

The report was adopted without discussion.

Branch Lines and Truck Competition

A committee, of which R. B. White, general manager, Baltimore & Ohio, is chairman, submitted reports on three topics: (1) Proper service on light branch lines. (2) How to meet truck competition in the handling of l.c.l. freight and (3) Public relations between railroads and shippers.

The railroads using buses or trucks in meeting such competition are faced with the following facts when such

an attempt is made: (1) Charter requirements frequently do not permit, necessitating the organizing of subsidiary companies; (2) hard surface roads do not always parallel the railroad for their entire runs, thus leaving certain stations "high and dry" and, therefore, forcing railroad service; (3) hard surface roads do reach the larger communities, giving the motor bus the cream of the business.

In making this study, take the people, as well as the

Public Service Commissions, into your confidence. In doing so you will find that the people can be made to realize the unreasonableness of requiring excessive service and will appreciate the railroad company's position.

On light traffic lines, where daily train service is required, it is economical to establish mixed train service only. The mixed train service will expedite the movement of freight and provide a way to handle passengers, mail, express and milk. Where passenger train service is required and a steam train is uneconomical, motor service should be substituted for the steam train. A motor train of one to three units can be operated for 50 to 60 per cent of the cost of operating a steam train.

Truck competition in handling of less than carload freight can best be met by putting the competition on a more equal basis. The development of bus and truck lines in some sections of the United States has so reduced the earnings of the railroads as to compel a corresponding reduction in train service.

Each facility, the railroad train and the motor truck, has a proper place in the transportation field and if properly co-ordinated can be considered adjuncts, one to the other, rather than competitors. Working with, instead of in competition with the railroad, trucks can be used, to make store door deliveries and to haul freight from concentration points to way-side stations.

Discussion

The most animated discussion of the convention followed the reading of this report. The experience of rail-

ways in all parts of the country in meeting truck and bus competition and in engaging in such business themselves was freely discussed. In reference to truck competition in general, G. O. Brophy, U. P., said that the railways should have no objection to truck competition if it is regulated as the railways are regulated. He cited the case of one western state which is eliminating one of the inequitable features of truck competition by taxing trucks and buses \$240 a year for operating on hard roads. H. R. Saunders, C. R. I. & P., told of an experiment in the use of trucks for local deliveries in the Chicago district. This experiment indicated that the only saving through such a method, which saving was slight, lay in the value of the freight car which was thus released for other service at an earlier time. F. O. Whiteman, East St. Louis & Suburban, cautioned against any attitude on the part of railroad men that the trucks can be eliminated. He pointed out that trucks offer a speedy service which fits in well with the public's desire for quick ordering and delivering. He concluded that trucks are therefore here to stay and that it behooves railroad men to recognize this fact and turn their energies to the development of truck transportation to their own use rather than to attempt to block its progress.

On account of the importance of the truck problem, the question in all its phases was referred to a special committee, to be made up of the representatives of the different railways in all parts of the country which are most active in dealing with this question, for further study and report.

Adjusting Train Tonnage

A report on the adjustment of train tonnage to prevent train interference was submitted by a committee of which E. L. Magers, superintendent, St. Louis-San Francisco, is chairman. An abstract of the report follows:

With the thought in mind that the rating of engines has been definitely established after theoretical and practical tests which call for the maximum tonnage that can be pulled over the ruling grades under normal conditions, consideration, in connection with train interference, should be given the following items:

1. Provision should be made at terminals for a proper check of the train in sufficient time to have waybills ready for delivery to the conductor at the time the crew reports for duty and also for having the air tested by the time the engine couples on to the train so that the train can move out of the terminal within at least 15 min. after the crew reports for duty. Terminal facilities have an important effect on train interference in that terminals should be sufficiently large to hold tonnage and obviate the necessity of starting trains to make room to receive other trains; also to permit proper classification switching, giving scheduled manifest trains preference over drag and empty trains at a time best suited to start them.

2. Freight trains should be dispatched from terminals at a time when they can move a maximum distance before encountering passenger train interference. This can be accomplished either by scheduling the trains or by the so-called symbol system.

(a) Careful study should be made of each engine district with the idea of placing a tender behind each engine which has sufficient fuel capacity to haul the train over the entire district.

(b) The same study should be made in connection with the water capacity of tenders to enable trains to move a maximum distance before being required to stop for water.

In connection with these suggestions it is recommended that the mechanical departments give these items consideration in specifications for new freight power.

4. While the locations of passing tracks have heretofore been established without a great deal of consideration to modern requirements, the location of additional passing sidings should have very careful consideration. As far as possible they should be located on level track or on descending grades for trains using them. Where traffic is heavy consideration should be given to the installation of lap sidings controlled by low voltage switch machines or manually operated switches. Preference should be given to the former. Passing sidings should have a direct connection with the telephone train dispatching circuit when possible. Passing sidings should be of sufficient length to hold the longest train which may at any time utilize it.

5. In automatic block territory permissive signals should be installed on ruling grades. The 19 order is undoubtedly a time and fuel saver and its extended use is recommended.

6. Attention should be given to journal boxes by the car department at terminals to insure minimum delay on account of hot journals.

7. Climatic conditions must be borne in mind. In many districts freight trains encounter both mountain and valley atmospheric conditions. This factor must be taken into consideration in building up as well as starting tonnage freight trains.

8. An accumulative daily report indicating the performance of individual trains, showing the average cost per gross ton-mile, overtime, train load, average miles per hour over district, etc., available on the following day for the information of superintendents, trainmasters and other division officials, compiled from train sheets in the chief

dispatcher's office, permits a closer check on the situation, enables officers to follow closely any condition that needs bolstering, and is of inestimable benefit in keeping a close check on the many essentials of economical transportation. In this connection, the setting up of standards to be attained in the different important items is a valuable incentive to both officers and employees, and where there are a number of districts or divisions in one system, a friendly rivalry between them is beneficial.

9. A definite program for the facilities required to move a maximum business over his division should be prepared by every superintendent. One of the greatest troubles which the transportation officer faces is his lack of a definite program covering the various improvements which are necessary. This results in considerable expenditures

for facilities which, due to their not being part of a definite program, become obsolete or useless in a few years. Therefore, too much stress cannot be placed upon the necessity for a definite program. It is not a difficult matter to prepare one; simply determine the maximum business to be handled for a certain period and base your figures thereon.

The committee suggested that the commodity carding of cars should generally be left to individual lines, but presented in detail the plan of one western line with which it was impressed. This plan provides for responsible inspection by lines furnishing equipment and by terminal carriers in case of loss or damage to freight. Various penalties are provided for faulty inspection.

The report was adopted without discussion.

The Embargo—Its Purpose and Proper Use

A report on embargoes and their proper use in large terminals was made by a committee of which Charles Burlingame, superintendent, Terminal Railroad Association of St. Louis, was chairman. The report is abstracted below.

The rules covering embargoes are all-sufficient and clear in their purport. But unfortunately in the past, they have not been strictly obeyed. An embargo, when properly issued, is very useful to control the movement of freight under conditions where such freight is liable to congest terminals and tie up equipment. Embargoes, both positive and permissive, are of two kinds: those placed by railroads due to their inability to handle traffic currently, a measure intended to stop acceptance of freight from shippers temporarily at points of origin, in order to avoid congestion on their rails; and those placed on account of consignee's disability to unload freight promptly on arrival, thereby causing an excess accumulation.

There is a way to bring about a due observance of embargo rules; it is for the railroad superintendents and the shippers and receivers of freight to get together on the proposition, through the superintendents' association and the regional advisory boards.

For the purpose of uniformity, to facilitate and expedite the transmission of embargoes, the railroads of the United States and Canada should be divided into regions and each region governed by a committee of railroad superintendents and chamber of commerce members, under the jurisdiction of the Car Service Division of the American Railway Association; also, the interchange of embargoes between railroads should be regulated by instructions issued through the Car Service Division.

It is apparent, from the investigation of the committee, that not only the railroads but the shippers need regulating. Therefore, a joint board is needed in every place in the country where there is a superintendents' association, this board to act in the large terminal where they are located as well as at junction points in their neighborhood. The local committees could avoid congestions of dead

freight at various terminals by the proper application of embargoes, which should, in turn, be given potency and be respected. They should actually handle each embargo reported to them, and educate the railroads and the trade to refrain from the bad practices of past years.

There should be uniform rules for handling embargoes between the railroad superintendents and a committee of shippers. The embargo notices in the past have been more honored in the breach than the observance, whereas the embargo should be a living and effective instrument to regulate the commerce of the country.

The committee believes that 48 hours' notice, when possible, should be given to all interested shipping districts before embargoes are made effective, and also desires to stress the importance, from a railroad standpoint, of prohibiting both the shippers and the traffic departments of the railroads from withholding the issue of embargoes just as soon as conditions make such action necessary. Embargoes should not be placed at the request of consignees unless they have been approved by this joint committee.

By a more systematized co-operation of interests, the necessity for placing an embargo could be foreseen and advance notices of it probably mailed, instead of always using the telegraph or telephone which become more and more expensive, both long-distance and locally; and, likewise, the territorial scope of embargo notices might be diminished materially. A standard notice blank might further abbreviate the work of distribution.

The committee offered the following resolution: That a copy of this report be forwarded to the American Railway Association through President Aishton, and a copy to M. J. Gormley, chairman, Car Service Division, American Railway Association, with the recommendation that a joint committee be appointed to formulate a set of rules to be submitted to the National Chamber of Commerce and the American Railway Association for their consideration and approval.

The report was adopted without discussion.

Increasing Average Load Per Car

A paper prepared by J. M. Walsh, superintendent, and R. B. Goe, supervisor of weighing and inspection of the Illinois Central, on increasing the average load per car, is abstracted below.

Probably there is no one item that will reflect reduced transportation cost per net ton-mile and increase car efficiency more greatly than an increased load, or a fully

loaded car, and while the subject of heavier loading has not received serious thought until recent years, the action taken and campaigns conducted for more intensive loading of equipment have, no doubt, been an important factor in the increased efficiency of railroad transportation.

In obtaining increased loading, it is necessary to create an interest and bring about a better understanding of

just what an increased or decreased load causes in the way of increased or decreased transportation costs and car efficiency, on the part of the shipping public, as well as railroad employees, and to keep constantly before those interested the progress in this direction.

There are, of course, many commodities that cannot be loaded to the maximum load limit, and also a great many that can be so loaded. In order to increase the carload of heavy commodities, such as pig iron, billets, sand, stone, gravel, ore, etc., A. R. A. Rule 86 was revised so as to permit the loading of cars of 40,000-lb. capacity and over, when equipped with standard axles, as follows:

Car capacity	Load limit, including weight of car
140,000 lb.	210,000 lb.
100,000 lb.	169,000 lb.
80,000 lb.	139,000 lb.
60,000 lb.	103,000 lb.
40,000 lb.	66,000 lb.

We have found that as yet a great many shippers do not understand that cars can be loaded in excess of 10 per cent above their nominal carrying capacity and, as a result, a great many shippers are not loading such commodities to the journal carrying capacity of cars for this reason.

It is, therefore, highly important that such information be given wide publicity with the shipper who loads the car, as he too often fears overloading and does not load his cars even to the 10 per cent above stenciled capacity. This old 10 per cent rule is obsolete, and mention of it should be avoided and the use of the maximum load limit applied.

One of the important factors in obtaining maximum loading is the building of the body of a car with sufficient cubical capacity to carry the maximum journal load of the principal commodities transported.

A study of coal cars owned by a number of the larger bituminous coal carrying railroads indicates a lack of efficiency in this direction. For example, the coal car equipment of six coal carrying railroads in this territory shows an average of 1537 to 1722 cu. ft. capacity on 50-ton cars, whereas an average of from 1800 cu. ft. on 40-ft. gondolas to 2100 cu. ft. on the average 50-ton hopper car is required to carry the maximum load limit of bituminous coals mined and prepared. Therefore, the average coal car cannot be loaded in excess of 80 to 95 per cent of its maximum carrying capacity.

What is true of coal cars is, in many instances, true of box cars used for loading medium heavy commodities, such as oats, grain products, lumber, cotton, etc. It is, therefore, highly important when considering the purchase of new equipment to give this feature close study. Care should also be exercised by the shipper in placing an order for cars. He should be required to specify commodity, approximate cubic capacity required and weight density, and equal care should be exercised by the railroad in furnishing him a car to fit the load, as it is a well-known fact that a great many 40 or even 30-ton cars have a larger cubical capacity than many 50-ton cars, and cars of small journal capacity and light tare weight should be utilized. Every additional ton of freight loaded will decrease the transportation cost per net ton mile proportionate with the tare and net weight of the car and its contents. For example, note the difference in transportation cost and net revenue with one additional ton:

Capacity	Tons per car					Gross rev. per trip		Estimated Trans. cost	
	Cubic	Nom.	Max.	Gross	Tare	Net	Per trip ton mile	Per trip	Net Rev.
2,448	50	61.5	83.5	23	60.5	\$242	68.26	.0084	\$173.74
2,448	60	61.5	84.5	23	61.5	246	69.08	.0081	176.92

Under the plea of greater necessity for economical transportation, urge shippers to load a full car, and consignees to buy a full car. An average increase of one ton per car for one month on any of our large trunk line railroads would reduce transportation cost enough to pay the expense of a modern terminal a month. A fully loaded car is equally as essential to economical operation in times of car surplus as in times of car shortage.

The A. R. A. Code of Rules, M. C. B. 30 and 86, should be emphasized in detail to the public with a view to eliminating the ten per cent rule which still remains uppermost in the minds of many shippers. The full intent of Rules 30 and 86 should be clarified for the shippers so that they may be well informed as to the rules permitting them to load in accordance with the journal capacity. Printed matter distributed to the shippers having reference to changes in rules, etc., does not secure the best results, and it is our practice to visit each individual shipper and acquaint the immediate supervising officer in charge of the loading with just what can be accomplished by an effort on his part to use a car to its maximum capacity.

Prevention of Grade Crossing Accidents

The prevention of grade crossing accidents was discussed in a paper by W. S. Williams, general superintendent, Illinois Central, and F. E. Williamson, general superintendent, New York Central. It is abstracted below.

The most serious problem confronting the railroads in their effort to prevent loss of life, injury to persons and damage to property is the frightful menace of collisions between trains and motor vehicles at railway-highway grade crossings. Opportunities for such accidents to happen naturally increase as the railroads handle an increasing volume of traffic, requiring the operation of more freight and passenger trains, and as the rapid growth in the use of freight and passenger carrying motor vehicles on public highways continues.

Statistics on grade crossing casualties, however, indicate that something is taking place to offset the increased hazard of accidents growing out of the greater railway and highway traffic movement over a fairly constant number of crossings.

In 1920 there were 138 fatalities at grade crossings for

every million cars registered. In 1924 there were 95 fatalities at grade crossings for every million cars registered. Or we may consider it from another angle: During 1921 one person was killed in a crossing accident for every 4,397 cars registered. In 1924 one person was killed in a crossing accident for every 6,043 cars registered. The most important factor is the systematic, well-planned, persistent campaign of education and admonition conducted by the railroads, aided and supported by the public, to promote safety thought and precautions. Several states have enacted laws compelling drivers of motor vehicles to come to a full stop before crossing railway tracks, and many towns and cities have put into force "boulevard stop" ordinances at all grade crossings of railway tracks, thereby greatly reducing the danger of accidents. These movements indicate the trend of the public mind toward the attitude so ardently sought, of organized, co-ordinated, aggressive opposition to every sort of chance-taking by the drivers of motor vehicles.

It is necessary that we have throughout the country a

uniform system of simple, understandable, consistent, well-ordered laws regulating the use of automobiles on all public thoroughfares. I strongly favor a system of examination and tests for determining the fitness of all drivers of motor vehicles to operate such vehicles on public highways. Regulatory measures should be enforced without discrimination. Above all, they should be backed and made effective by the powerful support of public opinion. The reckless and careless motorist should be eliminated from modern life by the absolute decree of public sentiment. That is the only way a menace to public safety can be eradicated.

Locomotive Efficiency

A brief report on means of securing greater efficiency from locomotives was submitted by the committee of which S. P. Henderson, superintendent, C. & A., is chairman. The report emphasized the necessity, if efficient service from locomotives is to be secured, of the following conditions: Tracks at terminals should be so arranged as to give free access to the enginehouse without interference between incoming and outgoing engines. Proper water handling facilities and the treatment of water where necessary are essential. Long engine runs have demonstrated that in many instances they can accomplish extensive economies, and such operation should be considered more widely. It is not economical to run freight locomotives more than 200 miles, however, due to delay in having fires and ash pans cleaned at intermediate terminals.

Sufficient road foremen and supervisors are needed to supervise the repair of locomotives and their proper use on the road. Cylinder and valve packing should be inspected every 30 days on passenger locomotives and every 60 or 90 days on freight power. Locomotives should be equipped with such modern devices as feed water pumps, power reverse gears, superheater units, mechanical boosters, etc., if their operation is to be made as efficient and economical as possible.

[The proceedings of the last two days of the convention will be published next week.]

Standard Forms for Purchasing*

By E. R. Woodson

Secretary, Railway Accounting Officers' Association

IT has been the practice of some railroads to print and furnish the forms on which bills are to be made against them. These forms are commonly called "customer invoice."

They are a nuisance to the vendor, and a unnecessary expense to the customer. Picture a large company that receives 1,000 invoices a day, practically every one of which is different from the others. Hardly any two of them will have the same general appearance. Substantially all of the forms have a different location for the same information. The forms are of all sizes and shapes.

It was out of a desire to remedy these conditions that railroads adopted customer invoices, but they added to the confusion by having each customer invoice different from all other customer invoices. The effect was that the billing department of a typical large concern selling to many railroads would require a battery of billing clerks making invoices on the concern's invoice, with a list of the railroads that specified invoices on their own special forms, or customer invoices. Arranged around the room

* An abstract of an address on standardization before the National Association of Purchasing Agents at Milwaukee, Wis., May 25.

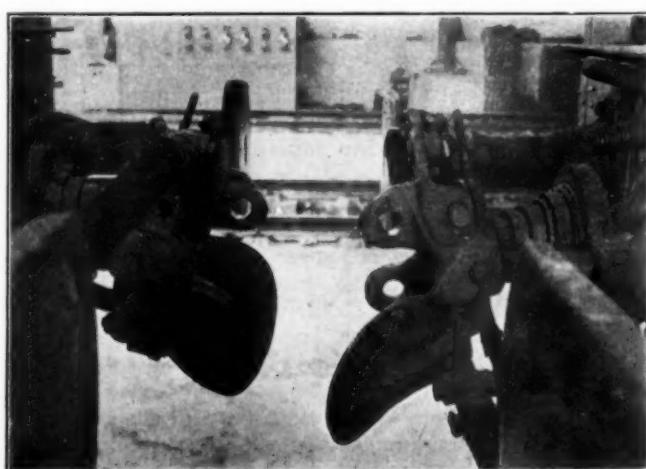
would be pigeon holes or filing cases, in which the customer invoices would be kept until needed. The billing clerk would be required to determine from the list whether to render the invoices on the company's regular form, or on the invoice furnished by the customer. If the customer's invoice was necessary, the billing clerk would be required to locate that customer's particular form, and read each item on the blank in order to be sure that the proper information was inserted in the proper space. These forms do not fit the tabular stops on the machines, and are generally unfamiliar and difficult to handle. While filling out such a blank, the billing clerk could probably render several invoices on the regular form.

Several years ago a movement was started among the railroads for standardizing their customer invoices. They collaborated with the National Association of Purchasing Agents in this effort with the result that on January 14, 1925, a national standard invoice was established. Since that time, many associations have endorsed the form and it has been put into use by many business concerns throughout the country.

The Pennsylvania has notified the concerns from which it buys that invoices rendered against it must be on the national standard invoice form. The Baltimore & Ohio is advocating the standard invoice. The Great Northern is sending forms to the supply houses so that they may be printed and used. The Gulf, Mobile & Northern is stamping all orders with the request that all invoices be rendered on the standard form. The Northern Pacific has arranged to indicate on all orders issued hereafter that the standard invoice form will be satisfactory. The Spokane, Portland & Seattle favors the standard invoice and will promote its adoption.

The Boston & Maine will adopt the standard form as soon as the old supply is used up. The Rock Island has adopted the national standard. The Chesapeake & Ohio is promoting the adoption of the standard invoice form among the railroad supply houses. The St. Louis-San Francisco will adopt the standard form when its present supply is used up. The Chicago & Alton has adopted the national standard invoice. The Cleveland, Cincinnati, Chicago & St. Louis encourages its use. The Missouri-Kansas-Texas prints on its order form a notation to the effect that invoices must be rendered on the standard invoice form. The Reading will adopt the standard invoice form when its supply of the present form is used up. The New York Central has adopted the standard form.

The foregoing indicates the tendency on the railroads.



Fotograms

Automatic Side Buffer Coupler Being Tried Out in France



Crane Has Removed the Two Day Coaches (One at Right; Other Just Behind Crane) from Locomotive (Covered with Debris in Center of Photograph)—International Photo

Storm Causes Fatal Accident

Slight wash of debris on D. L. & W. track at highway crossing derails tourist train—44 die

A SPECIAL passenger train on the Delaware, Lackawanna & Western, conveying a party of tourists from Chicago to New York, whence they were to sail for Europe, was derailed at a highway crossing 3 miles west of Hackettstown, N. J., about 2.30 a. m. on June 16 by an accumulation of silt and other debris which was washed upon the crossing during a thunder storm. Forty-four persons lost their lives and 27 others were seriously injured.

The train was made up of two coaches and five Pullman cars—all of steel construction. The heavy casualties were due to the fact that two of the cars—the coaches—were thrown directly atop the overturned locomotive and their occupants were scalded by escaping steam from the locomotive boiler beneath. Employees killed were the engineman, the fireman, the conductor, the head trainman and a Pullman porter. Virtually all the passengers who were killed were riding in the coaches which overrode the locomotive.

The passengers were German-Americans, for the most part resident in Chicago. A local tourist specialist organized the party for a visit to Germany. The train left Chicago over the Wabash about 6 p. m. on June 14. Arrived in Buffalo the following morning, the party spent the day in sight-seeing which included a trip to Niagara Falls. The train left Buffalo at 5:55 p. m. on June 15 on the Lackawanna. Its journey was without incident. It left Scranton, Pa., the first terminal out of New York at 12:01 a. m. and passed Washington, N. J., at 2:17. It was running extra but was maintaining the same schedule, although not running on the time of, a regular passenger

train, No. 10. Subsequent checking showed that the special had adhered to a minute to the running time of this train between all stations from Scranton. There is



P. & A.

Steel Coaches Shown Piled Up Over Locomotive—which Brought the Heavy Casualties

no evidence whatever, therefore, of any excessive speed. There is only one surviving member of the railroad's train crew so it is impossible to have extensive counter-check-

ing of speed estimates, but it is probably safe to say that it was not at the time of accident in excess of 50 miles per hour. Pullman employees who testified at the coroner's inquest stated the speed was between 40 and 45 miles an hour.

The night was stormy. The whole countryside had been drenched by a downpour from a severe electric storm. This storm, according to the residents of the locality, was particularly ferocious in the immediate vicinity of the accident. It amounted almost to a cloud-burst. At the highway crossing the rain washed some earth and small stones over the railroad tracks—not a great deal, but sufficient, so it happened, to derail the pony truck of the locomotive. (The preliminary reports in this matter are conflicting; some believe that it was the tender rather than the pony truck which was first derailed.) About 160 feet beyond this crossing was the frog of a cross-over switch. The derailed truck which had thus far bumped along over the ties became engaged in this frog and derailed the locomotive which toppled over on its side. The two day coaches overrode the locomotive and swung at right angles to the track. The first two Pullman cars likewise were derailed and toppled over; the last three Pullman cars did not leave the rails.

None of the Pullman cars were buckled or were otherwise seriously distorted structurally, but the coaches, by the much greater violence of their treatment, were not so fortunate. One of them was very badly mangled, as the photograph shows. Yet virtually all the deaths resulted from scalding by steam escaping from the locomotive. Very few of the victims seemed to have been killed out-

cities, from which ambulances were sent. The work of clearing the tracks, of course, was delayed by the fact that so many injured had first to be taken care of, so it was not until 12 hours after the accident that both running tracks were opened to traffic.

There were 180 passengers on the train and all of them were scheduled to sail from New York on the S. S. Republic. Of this number 111 actually sailed. Four others remained behind to take care of the injured or returned to their homes. The remainder—65—represents the total casualties, dead or seriously injured, other than employees of the railroad and the Pullman Company.

About 10 years ago the Lackawanna built a cut-off in this section of New Jersey, but continued in operation as a main line the former line which is regularly used for most of the eastbound through passenger trains. It was on this "old line" that the accident occurred. The line is rock ballasted, is laid with 105-lb. rail with tie-plates and screw spikes—the Lackawanna's regular main-line standard. It is equipped with automatic block signals. As stated above, the cars of the train were of steel construction. The locomotive, No. 1104, was a heavy Pacific type, the Lackawanna's standard for through passenger service. The train and engine crews were made up of men who had long been in the employ of the company. At the present writing the accident itself, as well as the heavy casualties, cannot from information now available be ascribed either to human or mechanical failure. Rather it comes under the category described by the generic term "acts of God."

Investigations are being carried on by the railroad, the Interstate Commerce Commission, the New Jersey Public Utilities Commission and the local county attorney. Two coroner's juries are sitting in the matter.



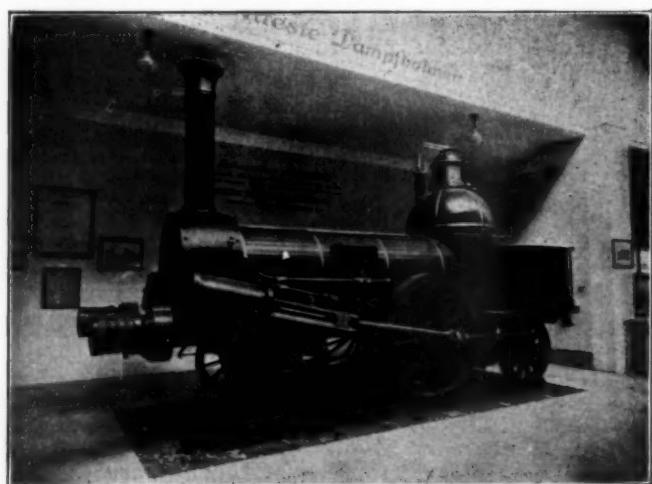
International

After the Worst Damaged Coach Had Been Removed

right and many of them did not succumb until removed to hospitals in surrounding towns.

Word of the accident was sent out by the rear flagman who, though injured, managed to make his way to a railroad telephone booth and advise the dispatcher at Hoboken, 58 miles beyond. A farmer who lived close by was an eye-witness of the disaster. Medical assistance and other rescuers were somewhat difficult to assemble from the surrounding countryside because the severe electric storm had put many telephone lines out of commission and in Hackettstown, three miles to the east, communication was still further hindered by damage done to telephone lines in a lumber yard conflagration which had been started by a bolt of lightning. However, within an hour or two rescue work was well under way. Two uninjured cars were made into an ambulance train to carry the injured to Easton, Pa. Others were taken to Dover, Hackettstown, Morristown and other nearby New Jersey

THE NEW YORK, CHICAGO & ST. LOUIS has filed with the Interstate Commerce Commission a petition for a further extension of time, from July 1, 1925, to January 1, 1926, in which to complete the installation of automatic train control required by the commission between Chicago and Cleveland. The petition says that the test section of 20 miles on the Chicago-Fort Wayne division, including the equipment of six locomotives, will be ready for inspection and test by June 20, but that the remaining 120 miles cannot be completed by July 1.



Wide World

The "Beuth"—One of the Earliest German Built Locomotives
—Now on View at Munich Transport Museum

New York Central Net Decreased

*Revenue ton-miles in 1924 19.8 per cent less than in 1923—
Major part of decrease in coal*

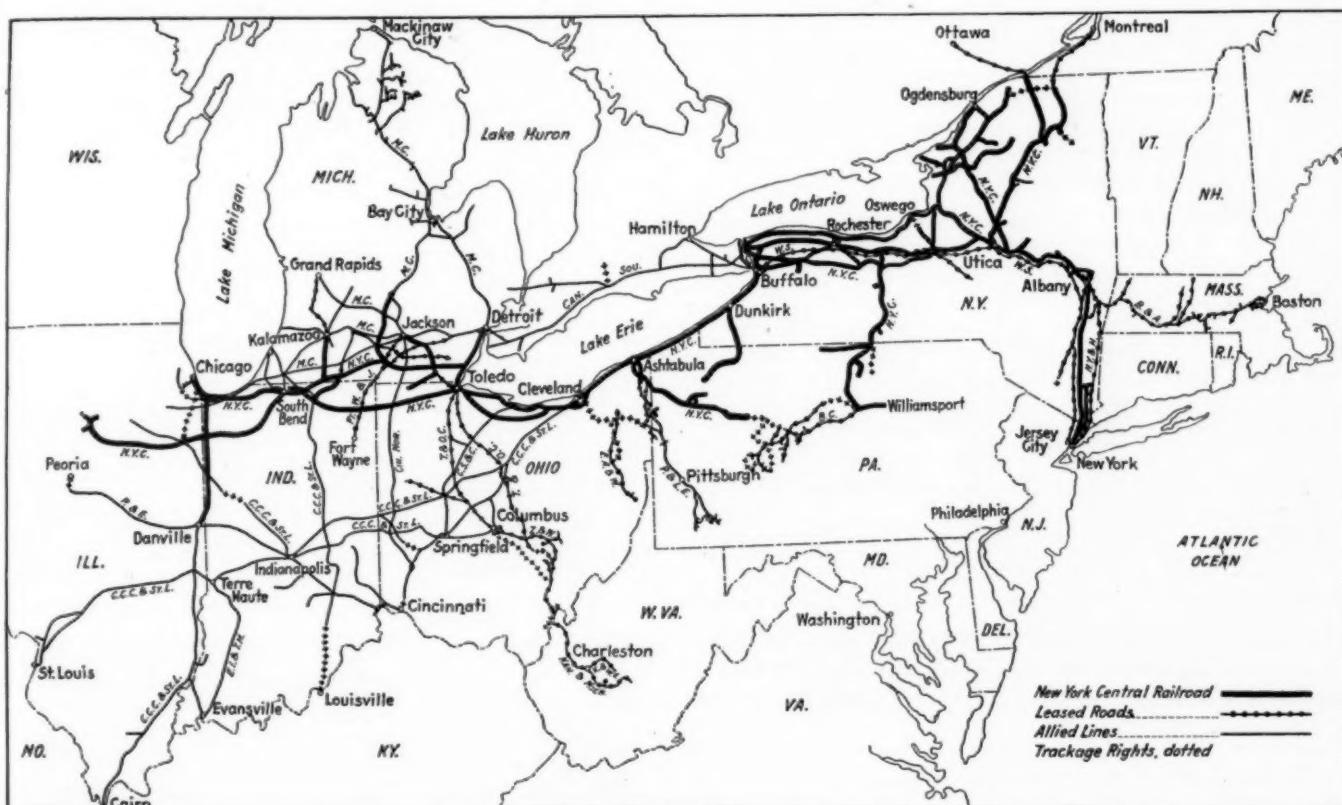
THE New York Central reported for 1924 net income after charges of \$39,250,400, equivalent to \$12.88 a share on the \$304,836,835 capital stock outstanding at the end of the year. The net income for 1923 was \$45,339,427, equivalent to \$16.90 a share on the \$268,323,375 capital stock outstanding at the end of 1923. Although the net income showed a decrease of \$6,089,027 in 1924 as compared with 1923, it was still good enough to have been exceeded but twice before in the company's history, namely, in 1916 and in 1923.

The reason for the decrease in net income was simply the falling off in business, particularly in coal. The

more & Ohio, which we are still accustomed to think of as being much more pre-eminently a coal carrier. The significance of the situation at this time is that 73 per cent of the New York Central's decrease in tons of freight handled in 1924 as compared with 1923 was in coal, coke and iron ore. The reduction in the case of bituminous coal was 30.7 per cent.

12.2 Per Cent Decrease in Operating Revenues

The total operating revenues in 1924 were \$369,606,930, which was a decrease of \$51,427,854 or, as above noted, 12.2 per cent from the total in 1923. As against this de-



The New York Central System

amount that the business fell off is, of course, given somewhat undue proportions in a comparison between 1924 and 1923, because in 1923 the New York Central reported the best business in its history. In 1924, as compared with the preceding year the freight revenues showed a decrease of 16.9 per cent, passenger revenues a decrease of 2.7 per cent and total operating revenues a decrease of 12.2 per cent. The revenue tons carried were 20.5 per cent less and the revenue tons one mile were 19.8 per cent less.

One does not ordinarily think of the New York Central as being pre-eminently a coal carrier. However, so extensive is the activity of the parent company in the New York Central System that coal normally constitutes about 40 or 45 per cent and products of mines about 55 or 60 per cent of the road's total revenue tonnage. These proportions are only slightly less than those, say, of the Balti-

crease in revenues there was a decrease of \$45,947,078 in total operating expenses, this decrease amounting to 14.1 per cent. This decrease brought the 1924 operating expenses down to \$279,971,063 and the relationship was such as to bring about a further decrease in the operating ratio, which was 77.41 in 1923 and 75.75 in 1924, the latter being the lowest figure reported since 1917. Expenses for maintenance of way and structures totaled \$46,450,039 and were \$4,121,795 or 8.2 per cent less than in 1923. Maintenance of equipment expenses totaled \$79,217,792, which was a decrease from 1923 of \$28,247,999 or 26.3 per cent. Transportation expenses totaled \$134,751,609, which was \$14,258,153 or 9.6 per cent less than in the preceding year. Something over one-half of the decrease in transportation expenses was in fuel. Fuel economy has now reached that point on the New York

Central so that in 1924 the company handled its freight service with a fuel consumption of 127 pounds of coal per thousand gross ton-miles, which figure compared with 149 for the eastern district and likewise 149 for the country as a whole. Affecting the saving in 1924 was also the decrease in cost of coal per ton.

Decrease in Freight Train Car Repairs

It is of special interest that no less than one-half of the substantial decrease that was made in expenses for maintenance of equipment and about 35 per cent of the total decrease in operating expenses was in the single primary account of freight train car repairs. The charges to this account in 1924 were \$16,132,117 less than in 1924, a decrease of 40 per cent. The charges for the account in 1924 were \$24,305,299 as compared with \$40,437,416 in 1923 and about the same amount in 1922, which means that the New York Central's freight car situation has now been restored to normal and the road has put behind it the burden of catching up on the adverse bad order car situation existing following the return of railroads to private control. In spite of the marked reduction in the amounts spent for freight car maintenance, the statistics show that there was no deferred maintenance in 1924 but rather a slight improvement in an already satisfactory condition. The statistics (which include the Ohio Central Lines but not the Boston & Albany) show that in January, 1922, the average number of freight cars unserviceable on

1923 was 5.8 per cent. The New York Central does not show this figure in its own annual report or any other estimate of the rate of return on its property investment, as a result of which the comparable figure for 1924 is not available. However, it is of interest that the net operating income in 1924 was only slightly more than the standard return for the property during the period of federal control. The standard return or average annual railway operating income for the three years ended June 30, 1917, for the constituent properties that are now included in the report of the New York Central Railroad Company, including the New York Central, etc., and the leased Boston & Albany and the Toledo & Ohio Central lines, was about \$62,000,000. The slight increase of net railway operating income in 1924 over this amount by no means makes up for the increase in investment which has taken place since the test period. Additions and betterments in 1924 alone were \$47,427,023 of which no less than \$37,027,739 was for equipment. In addition to this, the account of improvements on leased railway property was increased \$4,915,684.

All of the foregoing figures have related to the New York Central Railroad Company and its leased lines, making up a total of 6,920 miles. Prior to this year the New York Central report used to cover only 5,700 miles, including the New York Central and the West Shore but not including the Boston & Albany and the Ohio Central lines, the earnings of which, though the properties have been

NEW YORK CENTRAL RAILROAD OPERATING RESULTS, SELECTED ITEMS, 1914 TO 1924
(Excludes Operating Results of Boston & Albany and Ohio Central Lines)

Year ended Dec. 31	Mileage	Revenue tons	Revenue ton miles	Average miles haul	per ton cents	Rev. train load	Rev. car load	Total operating revenues	Total operating expenses	Net operating revenue	Op. ratio	Corporate net after charges
1914	5,640	80,446,739	15,150,314,000	188	0.595	642	19.44	\$152,351,590	\$113,348,423	\$39,003,167	74.40	\$9,358,248
1915	5,640	87,828,429	17,617,028,000	201	0.592	743	20.42	167,912,333	109,394,345	58,517,989	65.15	27,711,474
1916	5,689	106,407,668	21,382,081,000	201	0.598	766	21.38	201,585,049	129,738,369	71,846,679	64.36	45,659,217
1917	5,685	110,237,661	22,542,548,000	204	0.603	843	24.15	216,267,517	153,597,905	62,669,612	71.02	25,599,220
1918	5,682	117,495,612	23,851,288,000	203	0.737	891	26.36	269,270,957	210,637,849	58,633,108	78.23	17,917,122
1919	5,675	96,048,798	20,186,750,000	210	0.862	881	24.22	283,659,331	224,964,912	58,694,419	79.31	19,917,251
1920	5,684	110,753,433	22,567,929,000	204	0.930	895	26.16	338,624,456	317,799,173	20,825,283	93.84	13,734,688
1921	5,704	74,475,185	14,831,625,000	199	1.208	727	22.01	292,130,995	221,768,390	70,362,605	75.91	22,295,686
1922	5,710	86,077,233	17,648,981,000	205	1.122	802	22.29	316,620,098	250,406,470	66,219,628	79.09	20,635,186
1923	5,699	118,633,168	22,764,912,000	192	1.035	862	24.15	365,175,188	278,602,021	86,573,167	76.29	45,339,427
(Including Operating Results of Boston & Albany and Ohio Central Lines.)												
1923	6,890	132,576,120	26,321,574,650	199	1.040	810	24.62	421,034,784	325,917,241	95,117,543	77.41	45,339,427
1924	6,920	105,351,776	21,095,677,532	200	1.077	761	22.77	369,606,930	279,970,163	89,636,767	75.75	39,250,400

the New York Central was 19.2 per cent of the total cars on line, which figure had been reduced to 9.7 per cent in January, 1923. In January, 1924, the figure had become 4.5 per cent and in January, 1925, 3.6 per cent, and the report for March, 1925, shows a figure of but 4.1 per cent. The March figure for the Boston & Albany was 2.8 per cent. There was in 1924 also a substantial decrease in costs of steam locomotive repairs, this decrease as compared with 1923 amounting to \$6,554,820 or 21 per cent. In March, 1925, the per cent of freight locomotives unserviceable was 23.9 as compared with 28.4 per cent in March, 1924.

Comparison with Standard Return

The New York Central's net railway operating income or net after equipment and joint facility rents in 1924 was \$64,635,074 as compared with \$70,989,101 in 1923, a decrease of \$6,354,026. This decrease was carried through the varying changes in the corporate income account so that the net income after charges, already noted as being for 1924 \$39,250,400 was \$6,089,027 less than in 1923. The New York Central's net railway operating income in 1923 closely approached the 6 per cent allowed by the Transportation Act before the application of the recapture clause. The rate of return on the investment in road and equipment, including material and supplies and cash, in

leased for several years, were taken into the system report under Non-operating Income, Separately Operated Properties, Profit or Loss, as the case might be.

Extent of Lines

The New York Central, the parent company of the New York Central System, extends from New York, Montreal and Boston via the Niagara frontier to Chicago, in addition to which the parent company operates a line to Peoria and a group of feeder lines serving the Clearfield and other coal areas in central Pennsylvania. The Ohio Central lines which are leased carry the properties south from Toledo through Columbus into West Virginia, extending south to Charleston and beyond. It has been noted that some 45 per cent of the railroad company's traffic is in coal. However, nobody thinks of the New York Central without thinking of its superior excellence as a carrier of fast freight traffic. It has been interesting in the last two or three years to notice the substantial improvement in fast freight service between the middle west and New York, and there have been many interesting developments, particularly with reference to service rendered by such properties as the Wabash, the Nickel Plate, the Lackawanna, the Lehigh Valley, etc. However, it is only fair to notice that while all these roads have been doing remarkable work for which they have deserved and

received from shippers merited praise, the fact still remains that the leading competitor at all times has been none other than the New York Central. Apparently this means that the New York Central has lost nothing from the standpoint of efficiency and ability to meet the needs of the shipper, even though it has become a large property with many ramifications of organization.

These same attributes, of course, apply also to the lines controlled by stock ownership, namely, the Michigan Central, the Cleveland, Cincinnati, Chicago & St. Louis line and the Pittsburgh & Lake Erie. The earnings of these properties accrue to the parent company in the form of dividend income which in 1924 totaled \$14,388,778. The New York Central has been gradually increasing its amount of stock held in subsidiary companies. Acquisitions in 1924 were not particularly large but at the end of the year the parent company held 84.69 per cent of the preferred, 91.31 per cent of the common or 90.15 per cent of the total outstanding stock of the Cleveland, Cincinnati, Chicago & St. Louis, and it held 94.82 per cent of the Michigan Central. The parent company owns slightly over one-half of the capital stock of the Pittsburgh & Lake Erie. The Big Four pays 5 per cent on both its common and preferred and in 1924 earned \$16.12 a share on the combined common and preferred outstanding. The Michigan Central pays 20 per cent dividends and in 1924 was sufficiently prosperous so that it earned at the rate of \$72.71 a share. The Pittsburgh & Lake Erie pays 10 per cent dividends and in 1924 it earned net income at the rate of 17.12 per cent. Its net operating income in 1923 was reported by the Interstate Commerce Commission as being at the rate of 13.7 per cent on the property investment.

These details show at least that the New York Central System is a very prosperous aggregation of properties.

The New York Central in 1924 continued its extensive improvement program of which the most important single development during the year was the formal opening on November 20 of the Hudson River Connecting Railroad or the Castleton cut-off, the \$25,000,000 project which was intended to relieve congested conditions at Albany, N. Y., and assist materially in the handling of freight

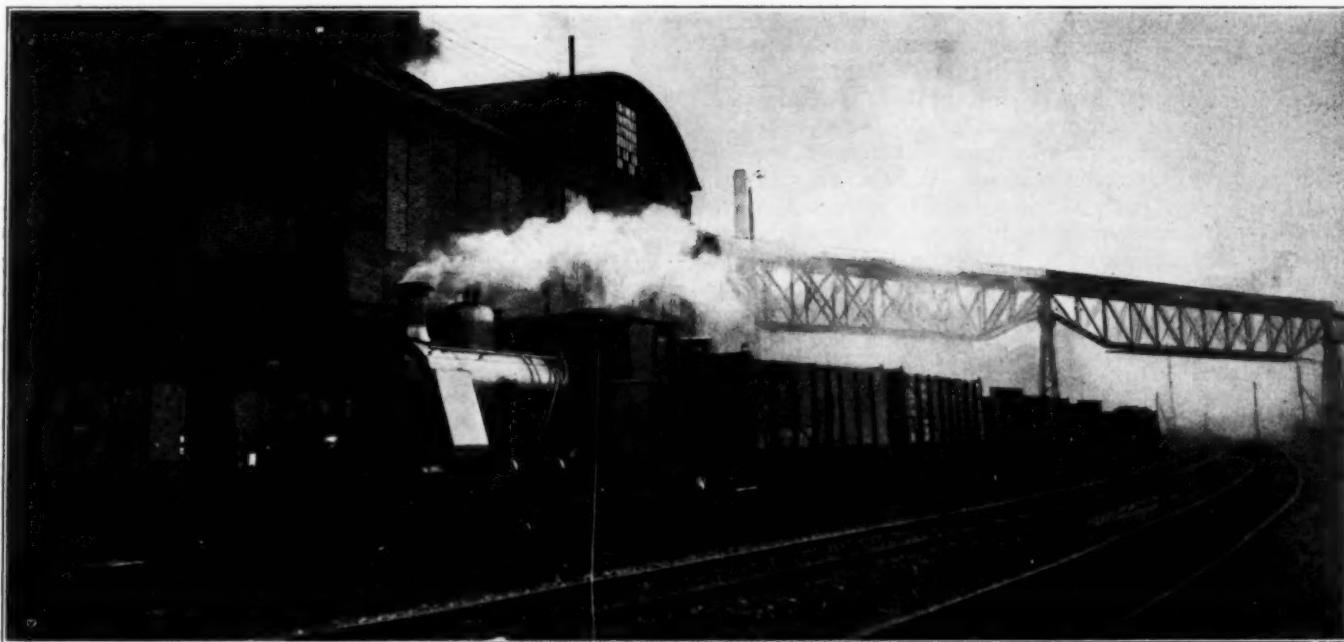
moving to and from New England and the river division of the New York Central.

One seldom finds a New York Central report in which there are not notations of large acquisitions of new equipment. In 1924, there were two equipment trusts issued, one of \$25,050,000 and one of \$20,955,000, covering equipment for the entire system. Of the former \$14,750,000 of the total was pro-rated to the New York Central, and included 61 locomotives, 110 passenger train cars and 5,240 freight cars, and of the latter, \$12,720,000 was pro-rated to the New York Central and included 48 locomotives, 190 passenger train cars and 4,200 freight cars.

Capitalization Changes

On December 31, 1924, the New York Central had outstanding \$304,836,835 capital stock, an increase of \$36,513,460 during the year. This increase was brought about by the sale of \$24,902,460 capital stock at par in January, 1924, and by the issuance of \$11,611,000 capital stock in exchange for 20-year 6 per cent convertible debenture bonds. The long term debt at the end of 1924 totaled \$776,916,391, which was an increase of \$6,936,902 during the year. This increase was brought about by a net increase of \$19,257,202 equipment obligations and was balanced by a decrease of \$12,320,300 in debenture bonds which had been converted. As of December 31, 1924, there were still outstanding \$88,301,700 debenture bonds. By April 1, 1925, \$82,500,000 of the total issue of \$100,000,000 had been presented for conversion into stock.

The New York Central has been criticized in many quarters in recent years on account of what has been held to be an unduly large proportion of bonds to total capitalization, or, as some have put it, on account of the unduly small proportion of stock to total capitalization, which, of course, is the same thing said in a nicer way. This condition has now been considerably remedied, and that, as a matter of fact, has been the most important single feature in New York Central financing for the past few years. The New York Central is one of the country's few billion dollar corporations. Its total capitalization at the end of 1924 was \$1,082,226,691, and its total fixed investments were \$1,274,237,684.



P. & A.

In the Ruhr

Wabash to Benefit From Owning Ann Arbor

J.E. TAUSSIG, president of the Wabash, announced recently at Owosso, Mich., that the Ann Arbor had been sold to the Wabash. In this transaction, the Wabash secures its own line into the heavy traffic producing territory of the northwest. That it will benefit from the possession of such a gateway is obvious. In the past, the Wabash has been compelled to look more to the southwest than to the northwest for the bulk of its eastbound traffic. It has been handicapped in its fight for eastbound traffic from the northwest by reason of the sharp competition it encounters at Chicago. The ownership of the Ann Arbor will aid it to overcome this handicap and should go far toward providing the Wabash with an increase in eastbound business.

The Ann Arbor extends from Toledo, Ohio, northwest 292 miles to Frankfort, Mich. It is essentially a bridge line between Toledo on the east, and western Lake Michigan ports on the west. Its western rail terminus at Frankfort, Mich., is unimportant except as a point from which four car ferry lines radiate to Wisconsin and Michigan points on the western shore of Lake Michigan. These car ferries provide service from Frankfort to Manitowoc, Wis., 79 miles; to Kewaunee 60 miles; to Menominee, Mich., 80 miles, and to Manistique, 100 miles. At the last port, connection is made with the Manistique & Lake Superior, which is owned by the Ann Arbor. The car ferry lines connect on the west shore of Lake Michigan with the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Soo Line, the Green Bay & Western, and the Wisconsin & Michigan.

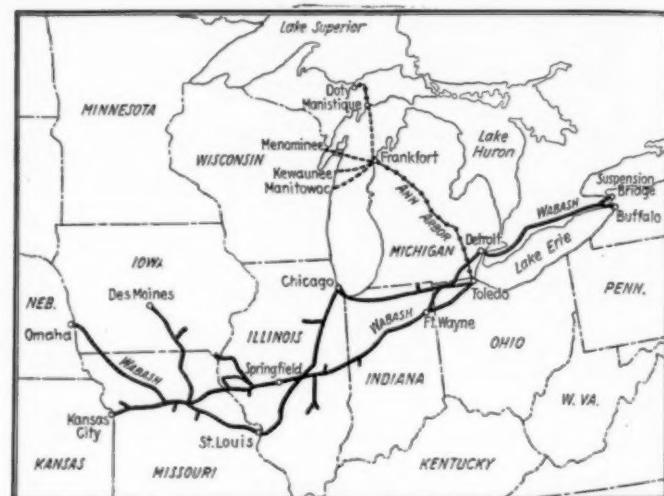
The Ann Arbor has no branches and originates comparatively little traffic on its own lines. Most of its freight trains are through trains handled from the eastern terminus without break-up to the western termini, and vice versa. The traffic east and west is about evenly divided, with the eastbound traffic slightly in excess of that westbound. The Ann Arbor offers as its strongest bid for traffic a short line route from the northwest to the east, and in the opposite direction, avoiding the congested Chicago district. The saving in distance between eastern and western points is as much as 152 miles in some instances.

Eastbound, the principal commodities carried are, in the order of their importance, forest products, manufactured goods and merchandise, grain and grain products, pig iron and iron ore, dairy products and paper. It is obvious that this traffic originates almost entirely on the west side of Lake Michigan. Westbound, the principal traffic is in coal, with iron and steel articles, manufactured articles, and merchandise and automobile parts following in the order of their importance as traffic. Most of this traffic originates in the eastern part of the United States. The car ferries, which ultimately receive virtually all of the Ann Arbor's tonnage, carried a total of 1,505,003 tons of freight last year; 853,550 tons eastbound and 651,453 tons westbound.

The Ann Arbor has been very progressive in developing its lake service and has become a factor of importance in the handling of freight between the east and the northwest. It now owns five ferries, one of which is said to be the largest in the world. The Ann Arbor also has originated a number of methods of increasing the efficiency of ferry transportation, such as in transferring cars from one vessel to another in mid-lake, in the handling of tourist automobiles, in the use of wireless and in the lengthening of its ferries.

Ownership of the Ann Arbor will unquestionably augment the Wabash's traffic over all lines, particularly the eastern division. Connecting with the Wabash St. Louis-Buffalo main line at Milan, Mich., the Ann Arbor may be expected to give to the Wabash a considerably increased amount of traffic for transportation over the latter's line from Milan eastward. With this increased eastbound traffic destined to points east and south of Buffalo, the Wazash should be enabled to trade more extensively than it has in the past with the lines east of Buffalo and thus secure more westbound traffic for its entire system.

One of the Ann Arbor's strongest bids for traffic has been for carload shipments which it handles on a fast schedule from Toledo to the west side of Lake Michigan



The Wabash and the Ann Arbor

at the various termini of its ferry service. Its schedule for through freight calls for departure from Toledo at 1 p. m. and arrival at Frankfort at 4 o'clock the following morning where direct connection is made with the car ferries which cross the lake before noon of the same day, the total time consumed from the eastern to the western end of the Ann Arbor rail and lake line being approximately 23 hours.

The Wabash may be expected to extend this fast service over its lines east to Buffalo, providing a new fast freight route from the east to the northwest, as well as in the opposite direction, and in this respect competing with both the Pere Marquette and the Grand Trunk.

The lines of the Wabash and the Ann Arbor serve such distinctly separate territories that there is little duplication of facilities and no extensive consolidation of properties is anticipated. Some economies may be effected at Toledo through the unification of facilities at that point, but that is probably all. Whether or not the Wabash will merge the Ann Arbor into its organization or continue to operate it as a separate company under a separate administration has not yet been disclosed. It appears certain, however, that in whatever manner the Wabash administers its control of the Ann Arbor, it will benefit materially from its ownership.

THE FREIGHT CLAIM PREVENTION COMMITTEE of the American Railway Association, to prevent the presentation of claims for loss of gasoline from metal barrels, has issued a circular which aims to prevent the leakage which would give rise to such claims. It recommends the use of a thin layer of molasses on the threads of the bunghole. A certain oil company has employed this safeguard for two years with uniform success.



**PROCEEDINGS OF
DIVISION V-MECHANICAL
AMERICAN
RAILWAY ASSOCIATION**

**CHICAGO
JUNE 16-18, 1925**



Mechanical Officers Meet in Chicago

Economic and efficient handling of equipment in meeting traffic demands keynote of convention

The 1925 annual meeting of the Mechanical Division, American Railway Association, was held at the Drake Hotel, Chicago, Tuesday, Wednesday and Thursday, June 16, 17 and 18, 1925.

The meetings were called to order at 10 A. M. each morning by

J. J. Tatum, general superintendent car department, Baltimore & Ohio, chairman of the Division. The Tuesday session was opened with an invocation by the Rev. Scott R. Hyde, Chicago. This was followed by an address by R. H. Aishton, president of the American Railway Association, an abstract of which follows.

Address of President Aishton

Two years ago when we met here the railroads were just emerging from a convalescence from a very serious illness. You know the conditions that prevailed at the end of Federal control. You know the general dissatisfaction there was throughout this country with transportation.

But following that convention, in the years 1923, 1924, and 1925 up to the present time, there has been no question in the minds of the American people, in the minds of the Federal or State officials and commissions as to the adequacy of service afforded by the transportation lines in this country. Never in that entire period with its very large traffic has there ever been a failure at any part of this country or in any emergency to have a car ready for shipment when it was ready to move, and neither has there been any failure to move the freight offered in a time appreciably less than was ever given by the transportation companies in this country before.

What has been the effect throughout the country? What has been the effect with the shippers? You do not hear anything today about inadequacy of service. On the other hand, wherever you go through the length and breadth of this land, whether it is in the apple orchards of Washington, the cotton fields of Texas, the industrial centers of the East, or the grain fields of the Northwest, you have everybody throwing up their hats and boasting for the railroads and indicating what an efficient job they have done.

I want to take the opportunity to thank heartily the Mechanical Division, its various chairmen of the General Committee, its present General Committee, the various committees, and the individuals that operate these railroads for what they have done to bring about that result.

Transportation today is adequate. It is reflected in the report I saw in the morning papers from our office at Washington. Take the week before last, which is the last report we have. The railroads of this country loaded and moved 994,874 carloads of freight. Two years ago when we set 1,000,000 cars as the mark, it was the top notch of transportation in this country, and yet week before last, you moved within 5,000 cars of that number at an off season of the year when transportation is not by any means at its maximum, with 300,000 surplus cars and about 7,000 surplus locomotives ready for business when the fall movement comes.

Now, I am no prophet, but I feel confident that no matter what load of transportation is offered to these railways this autumn or in succeeding autumns, there never again is going to be in these United States or in Canada any question as to the ability of the railroads to furnish adequate, prompt, and proper transportation for whatever may be offered. We have made some estimates, and I would not be surprised this fall to see all previous marks surpassed.

There has been a change in the commodities that are being handled. There has also been a change in the distances they have been hauled. The furnishing of adequate transportation has brought about a profound change in the industrial relations of this country. Where it used to be that a man would figure on delays in transportation and stock up for weeks and months in advance, today dealers and shippers are purchasing on the basis of adequate transportation. Adequate transportation has brought about another result, and that is in the amount of capital tied up in goods in transit. The shortening of the time that goods are in the hands of the railroads has brought about very much lower rates on capital

and is one of the prime reasons why today money is cheap in this country.

I had a shining example of that just the other day. A man came in to see me, and said, "I don't hand the railroads a bouquet very often, but I think it is due them that I tell you." His company ships ore from Butte, Montana, and Bisbee, Arizona, down on the eastern seaboard. He said, "We recently had to ship a lot of concentrated copper ore down there by rail. We kept an accurate tab on about 500 carloads, and it was on the road only thirteen days." He said, and this is the significant thing, "It has entirely revolutionized our way of doing business. We used to keep big stock piles. Today we are making our shipments according to our daily requirements with the absolute knowledge that that material will be delivered to us as it is needed. The saving we make on interest charges on that copper ore, which is very valuable, alone goes a material way toward paying the freight charges."

There is another side, however, that is not so satisfactory. The work your Division, all the other Divisions of the Association and the individual railroads are doing has been and should continue to be to produce the largest economies that are possible in the operation of these railroads. In other words, keep your eyes and ears open. If you see or hear of a better way of doing a thing, go after it, because one of the great questions in the public mind today, and that will be prominent at the national capital in the next year or year and a half, particularly in connection with the investigation into the question of freight rates, their relation to each other, and their adequacy to produce revenue to attract capital, is the economies and efficiencies in the operation of these railroads. You cannot do any greater work than to put in the hands of your representatives who will have to put their case thoroughly before the people and answer that question, the answer as to whether you, as an organization, and your individual railroads are taking advantage of every known thing that is humanly possible to bring about greater economies.

This is the fifty-eighth annual meeting of the Master Car Builders' Association and the Master Mechanics' Association, and their successor, the Mechanical Division of the American Railway Association. In that 58 years your record has been one of continual accomplishment along lines of economy, safety and efficiency. In 1882 there were 56 different kinds of axles in the equipment of the railroads of this country. Today you have one type with six sizes. That of itself is a tremendous accomplishment. In 1882 there were 58 kinds of journal boxes. At the present time you have only one kind with six sizes. There were 26 kinds of couplers. At the present time you have only one. There were 20 different kinds of brake shoes used on freight cars. At the present time there is only one. In 1882 there were 27 different kinds of brake heads. At the present time there is only one kind.

These are some of the things you have accomplished in simplification and standardization that in the end have brought about the ability of these railroads to move freight at a rate per thousand ton miles materially less than that afforded by any transportation by railroad in the world. I am not going into details as to the other things you have done. What I have recited about these various parts of freight cars is an indication of what has been done in every direction.

Take the specifications for materials. Take this standard car that we have had so much discussion about, and about which some

of you have felt disappointment because we have not moved faster. I believe that safety in getting the real answer to that matter lies in the fact that you have not moved faster. That is indicated by the standards that you have already prepared and approved in this Division, and which today are very largely governing the building of new freight equipment.

It is my prediction that the next two or three years are going to see a standard car perfected that in its main requirements as to dimensions is going to govern the building of 90 per cent of the equipment in this country. While your accomplishments in the past have been great, there has been no time when such constructive progress has been made in the work of this Division as in the last two or three years.

You are studying a lot of things which some of you think the American Railway Association ought not to consider. But just consider that there are a lot of people, not railroad people, who get these ideas and somebody has to have the answer for them. Who better can find the proper answer for us than you gentlemen who have spent all your lives in the development of this mechanical machine on the railroad?

You made a splendid showing this last year, with \$80,000,000 less expense for maintenance of equipment. Quite a part of that is due to the very large amount of new equipment and the vast capital expenditures made by these railroads. I notice that the railroads last year expended \$104,682,000 in new shops, improved shops and improved facilities, to reduce the cost of operation.

That brings us to the point that I have already mentioned that, while the service was adequate, there was one side of the question that was not satisfactory. It has been determined by Congress through the Transportation Act that the railroads are entitled to a reasonable return on the capital invested providing the operation is conducted in an efficient and economical manner. The return in no year since the railroads came from Federal control has reached the amount set under the law by the Interstate Commerce Commission as a fair and reasonable return. That rate today is 5 3/4 per cent. In the year 1923 the railroads were \$99,000,000 short of what is a reasonable return on the capital, as indicated by the

tentative valuation as prescribed by the Commission, which is not the value as claimed by the railroads. Last year it was \$148,000,000 that they were shy, and in the first three months of this year they were still short \$21,000,000 of that reasonable return.

Now, of course, the railroads of the country cannot go on spending money, investing capital indefinitely, unless they receive a fair return—such a return as will attract capital, which in turn will provide more economical and more adequate transportation.

So there never was a time when the work of this Division was any more important to the railroads than the present time, for the next year or two concentrating on those things which will bring about economies and at the same time maintain the efficiency which you have maintained in the last two or three years.

Outside of the matter of economy there is another important thing you want to keep in mind. We heard a great deal for a number of years about the lack of opportunity for management; that governmental activities were taking the place of individual management. I am not at all sure that in some ways possibly we were not a little at fault in not taking the initiative, and that this lack of initiative on our part encouraged action through some arm of the government that felt it must take the initiative. The government does not want to get into the game, but to prevent their getting into the game you gentlemen have got to function. You have been functioning, and today you have got a standing established with the officers of the government such as you never had in your history. And as long as we keep that way there won't be very much question about the government interfering with your management.

Today, as at no other time, when any question arises in regard to something on the railroads one of the first steps taken is to communicate with your chairman. If they can't get him they get me, and I communicate with Mr. Tatum, or whoever may be chairman.

I love the government. Our government is the greatest government in the world, but I love it best when it is not undertaking to manage the railroad business and I am going to try to keep it from doing so if I can.

Chairman Tatum's Address

The following is an abstract of Chairman Tatum's address:

The importance of these Mechanical Division conventions cannot be measured and should not be underrated. We should consider the responsibilities resting upon us as members of this great Association.

The proper management of railroad properties affects the investments of over two million stockholders, the greater proportion of them small investors, many of them fellow railroad workers. Railroad securities to the extent of approximately two billion dollars are owned by insurance companies, representing over forty million people. The banks of this nation are holding the savings of its patrons to the extent of seventeen billion dollars, over one billion of which is invested in railroad securities.

To point out further the immensity of our obligations, the statistics of the Labor Board show there are employed in the maintenance of equipment department of all Class I railroads in the United States, as of February 1, 1925, 541,057 employees. In 1924 the expenditures of the maintenance of equipment department of Class I railroads represented \$1,270,119,592, or 21.22 per cent of the total operating revenue of \$5,986,492,120. In addition to this we are responsible for many of the designs and standards of new locomotive and car equipment on which there is expended yearly many millions of dollars for its purchase.

Our railroads in the past 100 years have been of unparalleled importance in the growth of the United States, when it is considered that during the same period the population of this country has expanded from ten millions to one hundred and ten millions. The wealth of this nation one hundred years ago was less than three billion dollars; today, it is over three hundred billions.

Never was there a greater opportunity for the further development of this nation than we have today. Never were the opportunities greater for intelligent, level-headed, hard-working men of high character. Their efforts to manage wisely the accumulated machinery and wealth will not only reflect upon themselves and their dependents, but upon the nation as a whole.

In my opinion the management and economical operation of rail-

roads will depend very materially on the establishment of better understanding and relationship between the public, railroad management and the workmen. This, I think, can be best brought about by co-operation between the railroad managements and their employees. We must endeavor to understand the employee's side of his relationship with the company as we would have him understand the management's side. As managers we should put ourselves in the workman's place in reasoning out the differences that may exist between us from time to time.

The railroads must be kept in uninterrupted operation. They must provide the service required at all times. This can be accomplished with the peace and good-will of our employees, which is assured when we are willing to co-operate with them and they are willing to co-operate with us. Perhaps the greatest and most effective co-operation can be obtained by having employees become interested in railroad properties to the extent of becoming owners of their stocks. When financially involved we are more conservative in our actions and more interested in the final results than when not so involved. Therefore, if all the employees of railroads were stockholders to a more or less extent there would be a greater assurance of peace and co-operation.

One of the most outstanding reports this year is that of the Committee on Car Construction; the designing of the double sheathed box car, and the work of the special sub-committee of the Committee on Car Construction in preparing a manual of fundamentals for car design. Another important work was that of the Committee on Wheels. This year they have prepared a manual of wheel shop practices including description of all the different kinds of wheel defects, etc., which they will present.

At the last convention it was thought that we would adopt as recommended practice the all-steel double-sheathed box car. This, however, apparently did not meet with the approval of sufficient members of the association to make this possible. I am pleased to advise, however, notwithstanding the fact that this design of car has not been approved as yet for recommended

practice, the Pennsylvania has built 22,000; the Baltimore & Ohio, 2,000; the Reading, 1,000; the Wheeling and Lake Erie, 1,000; the Norfolk & Western, 1,000, and the New York Central, 100—a total of 27,100 cars.

The A. R. A. single-sheathed box car has been approved as recommended practice, and to date I understand the Louisville & Nashville has built 2,500 of these cars; the Southern Pacific, 2,000; and the Missouri Pacific, 2,000—or a total of 6,500 cars.

There may be more of which we have no information.

The association approved and has built two double-sheathed wooden box cars, which have been designed during the current year by the Committee on Car Construction.

The most of the work of the association is necessarily borne by a comparatively small number of its members. We need assistance in our annual meetings, conferences and committee work, and I ask that you all contribute a part.

Report of General Committee

Association to have \$50,000 draft gear test machine for purpose of developing specifications

The membership of the Division at the present time includes 208 railroads, representing 399 memberships in the American Railway Association, and in addition thereto, 190 railroads, associate members of the American Railway Association. These railroads, members and associate members of the American Railway Association, have appointed 999 representatives in the Mechanical Division. In addition there are 1,065 affiliated members and 142 life members in the Division.

The last session of the Division was held June 11 to 18, inclusive, 1924. Since that time the General Committee has taken action on several important subjects. This action is outlined in the following report and your approval is respectfully requested.

Annual Meeting 1925

In accordance with the decision of the General Committee to hold meetings with exhibits only every other year, the annual meeting for this year is a strictly business meeting without exhibits of machinery and devices. Arrangement has been made, however, for a small exhibit of railway equipment by the railroads in the yards of the Illinois Central on South Water street.

This exhibit consists of box cars built to the designs of the Committee on Car Construction, including the single sheathed car adopted as Recommended Practice, the double sheathed wooden sheathed car which is being recommended for adoption as Recommended Practice by the Committee on Car Construction, and the all-steel box car built to the designs prepared by the Committee two years ago, action on adoption of which is held in abeyance.

In addition to these cars several locomotives illustrating the most modern locomotives yet designed are being exhibited by the railroads owning same.

Manual of Standard and Recommended Practice

The changes made in the Manual of Standard and Recommended Practice, as result of action taken on recommendations of reports considered at the 1923 annual meeting and approved by formal letter ballot, have been taken care of by issuing revised loose-leaf pages to be inserted in the Manual.

Mechanical Inspection Department

The Mechanical Inspection Department of the Division has, throughout the year, continued its investigation covering repairs to foreign cars and billing therefor on a considerable number of railroads. Reports of these investigations have been made quarterly to the Board of Directors of American Railway Association. Since January 1, 1924, where definite overcharges have developed as a result of these investigations counterbilling authority has been issued to the car owners, in accordance with the billing regulations approved at the annual meeting last year.

Maximum Load Markings for Freight Cars in Addition to Nominal Capacity Markings

This matter was considered jointly by Committees of the Mechanical and Transportation Divisions during the year and recommendations made to the Board of Directors and a letter ballot of the members taken. The recommendations, if approved, will be incorporated in a revision of the Standards of the Mechanical Division for the lettering and the marking of freight cars and

revision of Interchange Rule 30 and Car Service Rule 11.

In connection with this subject the Committee on Car Construction in its report, is recommending load limits for axles for 70,000 lb. capacity cars.

Investigation of Power Brakes

and Power Brake Systems

A Director of Research has been employed to conduct the power brake investigation as proposed by the Association, and arrangements have been made for complete tests of the various brake equipments offered on the test rack of the Association at Purdue University.

Settlement for Rebuilt Cars

The special committee of the Division considering this subject presented a unanimous report which was approved by your General Committee and transmitted to the Board of Directors of the American Railway Association. The special committee was instructed by the Board to confer with a similar committee appointed by the Railway Accounting Officers Association and the Bureau of Accounting, Interstate Commerce Commission.

The joint committee of the Mechanical Division and the Railway Accounting Officers Association agreed to a report which has been presented to the Director of Bureau of Accounts, Interstate Commerce Commission. To date, no advice has been received from that Bureau relative to this report.

Joint Committee on Utilization of Locomotives

The Joint Committee on Utilization of Locomotives of the Operating and Mechanical Divisions has been, throughout the year, conducting studies of the locomotive utilization on member railroads. A progress report from this Joint Committee has been printed and will be subject to discussion at this meeting.

Draft Gear Tests

Upon recommendation from the Committee on Couplers and Draft Gears appropriation has been granted for \$50,000 to construct a draft gear testing machine upon which tests of draft gears will be made under the auspices of the Association with a view of developing a specification for draft gears and complete information pertaining to this subject.

Life Members

The following members have been made life members during the year:

Date joined	Name	Title and railroad
1905	Barclay, F. B.	S. M. P., Illinois Central.
1905	Chidley, Jos.	S. M. P., New York Central
1905	Deeter, D. H.	M. M., Keady Co.
1905	Dickson, J. G.	S. M. P., Spokane, Portland & Seattle.
1905	Dinan, Arthur	Amarillo, Texas
1905	Downing, I. S.	G. M. C. B., C. C. C. & St. L.
1905	Eberle, Wm. F.	General Foreman, Pennsylvania.
1905	Ferguson, L. B.	S. M. P., Alabama & Vicksburg.
1905	McGoff, J. H.	Mech., Supt., A. T. & S. F.
1905	Meister, C. L.	M. E., Atlantic Coast Line.
1905	Mullen, D. J.	S. M. P., C. C. C. & St. L.
1905	Robider, W. J.	Fibreboard Co., New York City.
1905	Temple, C. H.	Chief of M. P. and R. S., Canadian Pacific.
1905	Wahlen, John	Supt., Springfield Electric Railroad.

Obituaries

The secretary has been advised of the death of the following members:

Name	Title and railroad	Died
Banks, O. L.	Supt., Pullman Company	Apr. 23, 1924
Gallagher, F. S.	Eng. Rolling Stock, New York Central	Oct. 26, 1924
Garstang, Wm.	Indianapolis, Ind.	Sept. 12, 1924
Haig, M. H.	M. M., A. T. & S. F.	Nov. 10, 1924
Holder, J. A.	Gen. M. B. M., Seaboard Air Line	Apr. 1, 1925
Howard, J.	S. M. P., New York Central	Mar. 24, 1925
Iffa, A. H.	Asst. Loco. Supt., United Rys. of Havana	Aug. 1921
James, Ed T.	34 W. Broadway, Mauch Chunk, Pa.	Nov. 3, 1923
Jaynes, R. T.	M. M., Lehigh & Hudson River	
Kalbaugh, I. N.	S. M. P., Coal & Coke	Oct. 13, 1920
Kent, F. S.	G. C. I., Pennsylvania	Jan. 19, 1925
Killeen, G. C.	Gen. Supt., So. N. Y. Power & Ry. Corp.	Sept. 21, 1921
Lewis, W. H.	Roanoke, Va.	June 4, 1924
Linstrom, C. A.	Chief Engr., P. A. & Mck. R.	Sept. 2, 1921
Littell, C. N.	St. Louis, Mo.	Sept. 17, 1924
Lord, Alfred W.	S. M. P., Quincy & Torch Lake	Sept. 15, 1920
Lynn, W. K.	Supt., Gulf & Ship Island	
McBride, B.	M. M., Southern	
Meloy, H. C.	Supt., Elec. Appl., New York Central	Oct. 13, 1921
Moir, G. M.	Asst. Supt. Equip., U. S. Railroad Adm'n.	
Monahan, F. J.	D. M. M., Louisville & Nashville	May 20, 1924
Porth, H. W. L.	M. C. B., Swift Refr. Transit Co.	Mar. 2, 1925
Rae, Clark H.	Asst. Supt. Machy., Louisville & Nash-	ville
Randolph, L. S.	Baltimore, Md.	Mar. 7, 1922
Reid, Chas. H.	Loco. Engr., N. Y. N. H. & H.	1924
Rogers, W. A.	Supt. Shops, Southern Pacific	Mar. 18, 1925
Sheer, J. M.	East St. Louis, Ill.	1922
Sinnott, W.	M. M., Baltimore & Ohio	Jan. 1, 1922
Smith, J. L.	S. M. P. & E., Pitts., Shawmut & North-	ern
Smith, W. A.	Chicago, Ill.	
Smith, W. G.	Denver, Colo.	Nov. 3, 1921
Snodgrass, W. C.	Pres., Blakely Southern Railroad	
Thayer, F. C.	G. R. F. E., Southern	Nov. 12, 1924
Thiele, C. F.	C. C. I., Pennsylvania	Apr. 27, 1923
Thomas, R. V.	Supt. Machy., De Queen & Eastern	
Thomas, W. H.	Philadelphia, Pa.	Mar. 7, 1914
Walton, E. A.	Franklin, Mass.	June 27, 1922
Weir, Robt.	M. M., E., D. & B. C.	
Westervelt, Jos.	M. C. B., New York Central	
Wightman, D. A.	Warren, R. I.	July 6, 1917
Williams, C. R.	Corning Machine Co.	May 27, 1918
Williams, W. H.	Gen. For., Erie	Mar. 1, 1924
Witt, G.	Lambert Bros. & Wirt	Nov. 6, 1924
Witt, J. G.	M. M., Washington, Idaho & Montana	June, 1923
Woodcock, C. A.	M. M., Caguas Tramway	

Nominating Committee

The General Committee offers the names of the following members as candidates for the committee on nominations:

F. W. Brazier, assistant to general superintendent rolling stock, New York Central; H. T. Bentley, general superintendent motive power and machinery, Chicago & North Western; J. J. Hennessey, assistant master car builder, Chicago, Milwaukee & St. Paul; C. E. Chambers, superintendent motive power and equipment, Central Railroad of New Jersey; W. J. Tollerton, general superintendent motive power, Chicago, Rock Island & Pacific; J. Purcell, assistant to vice-president, Atchison, Topeka & Santa Fe; J. S. Lentz, master car builder, Lehigh Valley; J. Coleman, general superintendent car equipment, Canadian National; R. W. Bell, general superintendent motive power, Illinois Central, and J. J. Tatum, superintendent car department, Baltimore & Ohio.

(The routine action with respect to the following subjects were also included in the report: Printing and distribution of the proceedings of the 1924 meeting; 1924 letter ballots, and the revision of the Interchange Rules, Loading Rules and Tank Car Specifications, recommended at the 1924 meeting and approved.—Editor.)

The report is signed by J. J. Tatum (chairman), superintendent car department, B. & O.; J. T. Wallis (vice-chairman), chief motive power, Penn System; C. F. Giles, superintendent machinery, L. & N.; A. Kearney, superintendent motive power, N. & W.; L. K. Sillcox, general superintendent motive power, C. M. & St. P.; J. Purcell, assistant to vice-president, A. T. & S. F.; C. E. Chambers, superintendent motive power and equipment, Central

Railroad of New Jersey; C. H. Temple, chief motive power and rolling stock, Canadian Pacific; G. E. Smart, chief car equipment, Canadian National; J. S. Lentz, master car builder, Lehigh Valley; W. J. Tollerton, general superintendent motive power, C. R. I. & P.; J. A. Power, superintendent motive power and machinery, Southern Pacific Lines; O. S. Jackson, superintendent motive power and machinery, Union Pacific; F. H. Hardin, chief engineer motive power and rolling stock, New York Central; W. H. Fetner, chief mechanical officer, Missouri Pacific, and A. R. Ayers, assistant general manager, N. Y. C. & St. L.

Shearing Off of Oil Box Bolts

Secretary Hawthorne: I am directed by the chairman to call your attention to one subject which was discussed yesterday, that is, derailments due to oil box bolts shearing off between top and bottom arch bars. The committee prepared a proposed circular which reads as follows:

"A recent investigation by a sub-committee chosen from the General Committee, delegated to make a critical investigation regarding the subject of derailments due to oil box bolts shearing off between the top and bottom arch bars, has been completed and the results therefrom point to the necessity for very much greater attention being paid to the size of journal box bolts employed on arch bars as well as other trucks fitted with separable journal box held in place by vertical bolts. It is urged that car inspectors be instructed to observe and correct cases where undersized journal box bolts are found, also that repair points be especially diligent in replacing items of this nature not in complete conformity with A. R. A. requirements, and in addition, to make replacements where wear has taken place to the extent of impairing the strength. Bolts worn at the top and bottom should be removed from service and new material of full section employed."

"The attached tabulation shows the result of an inspection made of 3,000 individual cars offered in ordinary interchange, indicating that for 40-ton capacity equipment 6.6 per cent of the bolts were undersized, and for 50-ton capacity equipment 9 per cent were found undersized, to say nothing of extraordinary wear being allowed to continue without correction, such cases being in part shown in the illustration attached to this pamphlet."

The General Committee has ordered that this circular be printed and distributed to the members, which will be done just as soon after this meeting is over as possible.

A motion was carried that the report of the General Committee be approved as a whole.

Nominating Committee Report

The terms of office of the Chairman, Vice-Chairman and seven members of the General Committee expire June, 1925. Your committee nominates the following for the offices of chairman and vice-chairman:

For Chairman—Term expiring June, 1926:

J. T. Wallis, chief motive power, Pennsylvania System.

For Vice-Chairman—Term expiring June, 1926:

L. K. Sillcox, general superintendent motive power, Chicago, Milwaukee & St. Paul.

As the terms of seven members of the General Committee expire in June, 1925, your committee nominates the following:

For the General Committee—Term expiring June, 1927:

A. R. Ayers, assistant general manager, N. Y. C. & St. L. W. H. Fetner, chief mechanical officer, Missouri Pacific.

F. H. Hardin, chief engineer, motive power and rolling stock, New York Central.

O. S. Jackson, superintendent motive power and machinery, Union Pacific.

J. S. Lentz, master car builder, Lehigh Valley.

J. A. Power, superintendent motive power and machinery, Southern Pacific Lines in Texas and Louisiana.

W. J. Tollerton, general superintendent motive power, Chicago, Rock Island & Pacific.

Your committee also nominates J. J. Tatum, superintendent car department, Baltimore & Ohio, to fill the unexpired term of L. K. Sillcox, who is nominated for the office of Vice-Chairman, and whose term as member of the General Committee expires in June, 1926.

The report is signed by F. W. Brazier (chairman), assistant

to general superintendent rolling stock, New York Central; H. T. Bentley, general superintendent motive power and machinery, Chicago & North Western; J. J. Hennessey, assistant master car builder, Chicago, Milwaukee & St. Paul; C. E. Chambers, super-

intendent motive power and equipment, Central Railroad of New Jersey, and W. J. Tollerton, general superintendent motive power, Chicago, Rock Island and Pacific.

On motion the report was received.

Report on the Design of Shops and Engine Terminals

Suggestions as to the layout of facilities in modern car repair shops

The following report constitutes a study of the design and layout of passenger car repair shops and is presented in response to may recent inquiries to the committee handling this subject for information regarding modern layouts of plants of this nature.

Within the last few years, in all manufacturing plants, much attention has been directed to the routing of the article being manufactured through the various stages and operations necessary to produce the finished article. It has been found that by routing, production is increased and as a result the cost per unit of output is correspondingly decreased. This is the result of:

1. Having definite operations for each workman.
2. Reducing waste time of workmen unnecessarily traveling about the shop.
3. Having definite locations for laying down material near the workmen.
4. Moving material by the shortest routes.

The routing systems have perhaps reached their greatest development in the automobile industry. Apparently railway repair shops, in general, have been the last to take up any such system. This is due, perhaps, both to the difficulty of applying such systems to the work of repairing railway equipment, and to the arrangement of most railway plants which are not of recent construction and do not lend themselves easily to routing systems. Even in the more modern shops it does not seem possible to apply a routing system to all classes of repairs. Within recent years, however, the so-called progressive system of freight car repairs has been installed in a number of shops and excellent results have been reported. In canvassing among a number of car shop supervisors it was found that it is almost a unanimous opinion that a modern passenger car repair plant should be designed along the lines of the progressive repair system.

However, in any plan of passenger car shop the progressive system as applied to freight car plants is not equally applicable to passenger car shops, for the reason that it is not convenient to move passenger cars from position to position as is done with freight cars. Nevertheless, it does seem possible to route materials and parts to be repaired from and to passenger cars so as to minimize labor.

Movement of the Car Through the Shops

In all layouts it is assumed that the cars going into the repair plants will pass in front of or near the electrical shop, plating shop, upholstering shop, and tin shop, and that, when it is most convenient, there will be removed from the cars: the batteries and electrical equipment, plated fixtures, upholstering, water coolers, etc., and these will be sent to the respective shops for repairing. The cars are then moved to the scrub room for interior cleaning. Here the sash, doors, deck screens, etc., are removed and sent to the varnish room for refinishing or, if necessary, to the cabinet shop for repairs. The chairs, tables, and other furniture are handled in the same manner. The cars then proceed to the paint shop or the sand blast building to have the paint removed by burning, or by sand blasting after which they go to the repair shop.

Upon coming out of the repair shop the cars are passed to the paint shop for refinishing and replacing of sash, doors, furniture, etc., and then move out on a track which is near the track on which they first entered the shop. Here the batteries, upholstering, plated ware, tin ware, etc., are replaced.

Coach Repair Shop

Coach repair shops are practically all of the transverse track type. The longitudinal track shop can not be used to advantage in repairing passenger train cars. Each transverse track has length sufficient for one or two cars.

In width the coach repair shop should not be less than the length of the longest coach on the road plus the length of each of the trucks, plus at least a 10-ft. aisle next to the wall and a like aisle between cars in a two car track shop. This will mean a width for a single car track shop of 110 ft. to 150 ft., and for a two car track shop of 220 ft. to 270 ft. The width may be decreased correspondingly if the trucks are not taken into the repair shop, but instead are removed from the cars at a stationary jack on the inbound track. The repair tracks should be spaced at least 24 ft, center to center.

The height from the floor to the bottom chord of the roof trusses should not be less than 22 ft.

The shop should be piped for water, steam, air, and welding gas, and should be well lighted both by natural light and artificial light. A sufficient number of outlets should be provided for drop cords and for operating electric welding machines and portable motor driven saws, joiners, etc. It is recommended that pipe lines in so far as possible be placed overhead. Underground pipe lines or pipe lines in tunnels are as a rule difficult of access and to repair.

The transfer table should be at least 90 ft. long if the longest modern coaches are handled, and to this should be added the length of the tractor if one is used. The cars are moved either by a cable pulled by a winch on the table or by a tractor. The tractors in use are operated by electric storage batteries or by gasoline motors, and they have either broad treads on the tires for running on platforms and concrete roads or flanged tires for standard gage tracks.

When handling a shop having two car tracks it is recommended that the transfer table have at least two tracks and if possible three, so that cars can be shifted with a minimum movement of the table. In the case of three tracks two of them are for holding cars from the shop repair tracks and the third is a "run-around" for the tractors.

Truck Shop

The truck shop should be located near the repair shop. It is advisable to provide the shop with an overhead traveling crane of at least 15 tons capacity for the shifting of trucks inside of the shop. If the traveling crane is not installed the repair floor should be provided with jib cranes or monorail crane of one and one-half or two tons capacity to assist the workmen in lifting the heavy parts of the trucks.

There should be ample storage space for trucks in the vicinity of the truck shop. In large plants it may be advisable to run the truck shop crane over the truck storage platform. The truck shop should be well lighted and heated and piped for air, gas torches, and electrical welding equipment, and the floor should have a concrete base covered with wood blocks or equivalent.

Wheel Shop

The wheel shop should be located adjacent to the truck shop so that mounted wheels can be quickly transferred between the two shops. Also the wheel shop should have about it sufficient

storage space for mounted and unmounted wheels and axles, and have depressed tracks for loading and unloading mounted and unmounted wheels.

It is recommended to install traveling crane service over the outside storage platform where the shop is of sufficient size to warrant it. When the crane is provided the depressed tracks are not required. Where one wheel shop is to serve both the freight car and passenger car departments it should be readily accessible to both of these departments.

The pipe shop, air brake shop, machine shop and blacksmith shop should be located close to the coach repair shop. If possible they may be under the same roof as the repair shop and occupy a position similar to that of the machine bay adjacent to the erecting bay in locomotive shops. For securing better light and ventilation it is advisable to locate the blacksmith shop separate from the other buildings, and possibly the machine shop also. These shops should have easy access to a material storage yard provided with racks and bins for pipe, bar iron, steel sheets and steel sections, coal and coke, and other supplies.

Storehouse

The storehouse, or as it is frequently termed the "sub-store" in which are held stocks of bolts, nuts, washers, screws, and also small forgings and castings of all kinds, should be located where men are not required to travel any great distance in reach of it. Even in shops having messenger service where the material men provide the workmen with such materials, much time is saved by having the storehouse close to the repair plant. The storehouse should be provided with an outside material platform and unloading track, and crane service if it can be used to advantage.

Planing Mill

The planing mill is most conveniently situated outside of the main repair shop and in a separate building. The arrangement of machinery and the getting of material to and from the mill is most convenient when so situated, and also the fire hazard about the planing mill is greater than any other part of the repair shop except the paint storage room.

The lumber yard will naturally be located adjacent to the planing mill and the dry kiln interposed between the lumber yard and the planing mill. The lumber moves through the dry kiln, and from machine to machine in the planing mill with the least back motion, and thence to the shop or finished material storage. The planing mill should be steam heated, and have a concrete floor.

Cabinet Shop and Pattern Shop

In many existing coach shops the cabinet shop is usually located on the second floor over the planing mill. There seems to be no particular reason for so locating this shop in a modern shop layout. If patterns in any quantity are to be stored a separate fireproof storage vault is advisable.

Paint Shop

The paint shop, like the repair shop, is preferably of the transverse track type having one or two cars on each track. The width of the building need be governed only by the aisle widths and the length of the cars on their trucks, as it is seldom that a car is off its trucks in a paint shop. Therefore, the building may be from 110 ft. to 125 ft. wide for a one car track shop, and from 210 ft. to 230 ft. for a two car track shop.

The tracks should be spaced at least 20 ft. center to center. The number of tracks required for a given output will depend upon the system of painting used. Where the bake oven process is used the painting time is about half that of where air drying is resorted to. The floors should be of concrete and amply provided with drains. In the scrub room troughs should be set in the concrete floor to catch the washings from cars. Wood block or other surfacing over the concrete is not required.

Particular attention must be given to the heating of the shop as its efficiency will depend upon the regularity and dependability of the heat. Where paint or varnish is applied with an air spray suitable ventilation should be provided. The shop should be piped for water, air, and also gas if the latter is used for burning off paint. Scaffolding suspended from the roof trusses is necessary and the adjustable type is preferable.

Sand Blast Apparatus

Where paint is removed by the sand blast process the sand blast plant should be located at a distance of at least 250 ft. from the

paint shop as the fine dust is easily carried by the wind. It is advisable, and in fact, almost necessary to locate a paint priming room adjacent to the sand blast building as the freshly sand blasted steel rusts almost immediately in damp weather. The priming room should be separated from the sand blast room by two partitions and a space in which air can circulate.

Platforms and Roadways

Within recent years material platforms of timbers or old car sills have been superseded by concrete platforms, and such concrete platforms are to be recommended. They do not require renewing as do wooden platforms and also are more easily kept clean and material stocks maintained in order.

With modern shops much of the material is handled by power driven trucks with trailers such as electric storage battery trucks, gasoline tractor trucks, and the like. To operate such trucks efficiently requires concrete roadways and good floors in the shops. Concrete roadways and power driven trucks have practically superseded the former method of handling material by push cars and hand trucks. The concrete roads also serve as fire roads. Therefore, the location of the concrete roadways with reference to the several shop buildings and material platforms is of prime importance.

Fire Protection

All railway shop plants comprise a hazardous fire risk and this is especially true of the car department particularly when wooden cars are being repaired. Therefore, ample protection against fire is essential. This protection should include:

1. An adequate source of water that can be supplied at fire pressure.
2. Water mains of sufficient size and properly located with respect to the buildings and furnishing convenient hydrants.
3. Trained fire department of the shop employees supplemented by protection from the city fire department.
4. Concrete fire roads kept clear of obstructions and having easy entrance for city fire department.
5. Sufficient hose reels in buildings, water barrels in lumber yards, and chemical fire extinguishers in paint shop or about especially inflammable materials.
6. Automatic sprinkler systems particularly in planing mill and paint shop.
7. Valves on pipe lines outside of buildings so that gas, water, air, and steam can be shut off from the buildings in case of fire, also switches on outside of buildings for cutting off electrical power and light lines that serve the buildings.

The report is signed by W. A. Callison (chairman), C. I. & L.; A. C. Davis, Penna.; I. S. Downing, C. C. & St. L.; B. P. Phelps, A. T. & S. F.; H. Gardner, B. & O.; J. Burns, C. P., and G. S. Edmunds, D. & H.

Discussion

Lee Robinson (Illinois Central): As there is very little wood in a modern passenger car, new passenger car shops should be primarily designed to handle cars of steel construction. With cars of steel body and underframe construction, all metal truck frames and rolled or forged steel wheels, the necessity of locating passenger car repair shops in conjunction with freight car shops in order to use facilities common to both departments does not exist to the extent it did in the past. Consequently, the passenger car shops can more readily be treated as a separate unit and all shops laid out in proper relation to each other without sacrificing convenience in order to serve other departments.

All railroads should devote much time and study to the scheduling and routing of work through the shops, together with the systematic delivery and handling of material. Many roads have made considerable progress in this respect, but many others are slow to change and prone to follow past methods and practices.

Opportunity should be given supervising forces in railroad shops to visit industrial plants to observe their methods with a view of adopting such of their systems as can be practically applied to repairing railway equipment. If all work movements are scheduled and material kept within ready access to the workmen, much lost time can be eliminated which will have the effect of increased output at reduced cost.

In treating with a subject such as the one under discussion one must necessarily deal with broad general principles and fundamental practices, which can be used by the actual designer in the

best way possible to meet his own particular conditions as to space available, output, shop practice and kind and type of equipment. I think it will be generally conceded that the plan of having both the inbound and outbound tracks adjacent, with the miscellaneous shops handling fittings and car equipment in close proximity, is the most practical and economical arrangement. The practice of placing two cars on each track also seems to work out successfully and is followed generally throughout the country.

A matter which must be given attention by practically all roads in the country is that of providing facilities and equipment for repairing motor cars of either the gas engine, gas-electric and in some cases even full motor propelled type. While no radical changes in the plans shown would be required, suitable shop space must be provided for the repairs to trucks, gas engine, generators and motors with which motor cars are equipped.

Physical Limitations on Shop Design

W. E. Dunham (C. & N. W.): Every railway shop and engine terminal has an individuality of its own that indicates the necessity for confining its boundaries to a definite and frequently irregular area, the amount and type of repairs to be made and the construction of the equipment to be handled. Those conditions vary so much on the several districts of even one railroad that it is impractical, as the committee has indicated, to lay down a standard shop plan for all railroads.

There are district fundamentals that should guide the designer of a shop. Without listing them in their relative importance they are:

Minimum cost of permanent installations; maximum efficiency with minimum idle time of tools and labor, and full measures of safety and sanitation. Any proposed shop plan must justify its cost in actual reduction of repair expense-time to the minimum—mere convenience is not satisfactory. Different plans and tool equipment should be thoroughly studied as to the anticipated expense and time required for the separate and aggregate repair operations. The plan can thus be selected which shows the minimum of time for holding the car out of service with the lowest cost, including, of course, interest and depreciation on the plant investment.

Considering the items of the committee's report in the sequence presented, we find that the stripping and trimming can be performed in the building and tracks assigned to washing and painting, respectively. Two movements of the car are thus eliminated during shopping and the necessity for a special building is avoided. The trimmings, when stripped, can be loaded on special trucks and hauled in trains to the shop where they are handled. They can be collected in a reverse manner and delivered when required, to the car wherever it may be.

Removing the trucks and handling the car on dummy trucks calls for a large investment in dummies, particularly at a shop where 100 or more cars are shopped each month. A jacking gang with air jacks can raise a car wherever it may be in its progress through the shop, and the trucks taken to the truck shop as required by that shop. That plan eliminates the necessity for a large truck shop or a large special storage space for trucks.

Such a procedure requires that both ends of each car be readily accessible for truck handling and the repair shop be suited to handle one car on each track. With a space for the aisle at each end and open space outside the building to store the truck temporarily when necessary a building not over 100 ft. wide meets the maximum requirements. If ground space does not permit the use of one long repair shop two or more shorter ones may be located parallel to each other with full length transfer tables between every other pair of buildings and a short table suitable to handle trucks only, between the alternate buildings.

Adjustable scaffolding is necessary on all repair and painting tracks. If supported from the roof a much heavier building framing is necessary than if placed on floor columns. Such floor columns are available as will not materially interfere with the full use of the space between tracks for handling material or performing bench work adjacent to the car, and considering the saving in cost of this type over the roof suspended type we would prefer their use.

The recommendation of the committee that all piping lines be overhead is excellent. All pipes and power lines should be well above the floor where their condition can be observed and irregularities corrected readily.

Transfer table pits should be as shallow as possible. A deep pit is a severe handicap during the winter in the northern districts

on account of filling with snow. A shallow pit with one or two walkways across, between the adjacent buildings, and inclines at each end, saves a lot of the time of the men.

The truck shop should be only large enough to run the trucks through in proper time to meet the schedule of the car. Trucks should not be undergoing repair to exceed four or five hours. Of course, this means special equipment in the way of cranes, hoists and similar labor saving devices. Our preference is to avoid parking the trucks at that shop and keep them under the car until actually required by the truck shop for overhauling.

Next to the truck shop should be the wheel shop and with that should be the other machine shop equipment. The use of depressed tracks for loading and unloading wheels is a plan that should be followed more than it is. The wheel storage dock should also be graded so that at all times the mounted wheels will be assisted by gravity in moving to their desired location for shopping, storage or shipping.

The storehouse stock should be well distributed over the entire plant.

Of course, the main storehouse will hold the principal stock but a small stock room should be established in the vicinity of where the actual consumption of small articles is the heaviest. Such stock room can be supplied promptly on telephone orders.

The construction of the paint shops will depend greatly upon the requirements of the industrial commission of the particular State in which the shop is to be located. This shop should be well ventilated, capable of obtaining and maintaining the desired temperature and should be free of all dust. With a transfer table on each side of this shop we find we can very satisfactorily place three cars on each track. As all cars are on their trucks in this shop and only trimming is done here besides painting, very little passage room is required along the shop other than at the outer ends of the outer cars.

This arrangement economizes in the span of floor space to be covered. It does, however, require spacing of tracks about 24 ft. center to center to give free access to all three cars on each track.

A very satisfactory sand blast house is arranged with a hip roof about twice the height of a car, leaving wide eaves to keep out the rain and with the side walls extending to within about 6 ft. of the roof. Such a building in the warmer climates quickly clears itself of sand dust so that a priming coat of paint can be applied to the car before it is moved out of the building. In the northern districts a warmed shed for priming, as recommended by the committee, is desirable.

An item of extreme importance in any shop layout and one that should always be stressed is the matter of easy and quick access to all parts of the plant for delivery of material. Roadways of concrete outside of buildings and runways also of concrete inside are a most economical investment. Power trucks and trailers can then operate to their full tonnage and speed.

I. S. Downing (Big Four): There certainly is a question just where you want to repair your trucks. We probably have at Beech Grove the most modern passenger shop in the country. Our truck shop is in one end of the shop, and we have cranes that we use to take the truck to the end of the shop. We have located in the truck shop a lathe, presses for pressing out the bushings, drills and all machinery necessary to repair the trucks. The cars are placed on steel horses. There is no question but what you have more clearance under a car than you do with a truck under it. Our truck shop is just a little small and we sometimes have to store material along the aisles between the two cars and on the outside until we can find an opportunity to get it into the truck shop.

I want to call your attention particularly to one thing in car construction. After we get our standard cars we are going to have standard shapes. This applies to freight as well as passenger cars.

The manufacturers today can manufacture shapes cheaper than we can make them in our own shops. The only reason that we are buying presses is because we would have to carry a large stock, much larger than we think we should, if we bought them outside at the present time, but as all railroads adopt the standard cars, there is no question in my mind but what the manufacturers will be very glad to press out shapes and carry them in stock to distribute to the railroads. They can do it today cheaper than we can do it in our own shop.

A motion to accept the report and to continue the committee for the purpose of developing recommendations for freight car shop layout, was carried.

Report on Locomotive Design and Construction

Committee defines an engine failure—Increased efficiency of modern power

During the past year the Committee on Locomotive Design and Construction gave consideration to the comparative merits of hydrostatic and force feed lubrication for locomotive cylinders and steam chests, and the best methods of application; the standardization of taps and dies used by railroads, and standards for bolt and screw threads; definition of an engine failure; rail stresses under locomotives; standardization of water columns; removable hand rail columns; and special designs of engines. The committee had no authority to conduct tests to obtain original data on the subject of rail stresses under locomotives and no report was made. However, investigations are in progress at the present time, the results of some of which have already been published. Following is an abstract of the reports on several of these subjects.

Hydrostatic and Force-Feed Lubrication for Cylinders and Steam Chests

Inquiries sent to the manufacturers of locomotive force feed lubricators requesting a statement as to the number of lubricators in service or on order as of March 1, 1925, developed that there are now in service, or on order, force feed lubricators of the various types, as follows:

Nathan Manufacturing Co.	386
United States Metallic Packing Co. } McCord	694
Formerly Locomotive Lubricator Co. } Schlacks	1308
Edna Brass Manufacturing Co.	36
Madison-Kipp Corporation (Information not available).....	2,424

These lubricators are distributed over quite a wide range, including 76 railroads and 13 logging or commercial plants owning locomotives.

The expressions received from the various railroads using force feed lubricators indicate that this method of lubrication is exciting

tion may be obtained of the influence of the method of oil delivery upon packing ring service, rate of wear and oil consumption, are shown in the table.

In preparing the table showing the relative results obtained from the two systems of lubrication, the record as obtained in passenger and freight locomotive service has been separated according to the class of service, following which a combination of the results, including both passenger and freight service, is also shown. There were 14 passenger locomotives under observation, during which time 38 valve rings in the hydrostatically lubricated positions, and 45 in the force feed lubricated positions were removed on account of being worn, broken or down. From these valve rings an average service of 13,471 miles was obtained with hydrostatic lubrication, and 11,749 miles with force feed lubrication. From these same locomotives there was a total of 72 and 104 cylinder packing rings removed from the hydrostatic and force feed positions respectively. The average mileage per cylinder ring was 7,600 for the hydrostatic, and 6,550 for the force feed.

A representative number of rings removed were measured for radial wear at five equally spaced points around the ring from the ends, and from the mileage performance record of these rings the average rate of wear per 10,000 miles has been determined, which, for the hydrostatic lubrication, was .027 in.; force feed lubrication, .029 in., the rate of wear being practically equal. Comparing the mileage made per pint of oil there is a marked difference favorable to force feed lubrication since an average of 50.6 miles per pint of oil was secured as against 30.5 miles for the hydrostatic. Attention is called, however, to the wide range in the oil consumption figures as indicated by the maximum and minimum results. With hydrostatic lubrication the maximum and minimum mileage per pint was 49.1 to 15.9 miles respectively, while with the force feed lubricator the range was from 101.8 to 21.4 miles respectively.

HYDROSTATIC VERSUS MECHANICAL LUBRICATION OF LOCOMOTIVE VALVES AND CYLINDERS

Type of lubricator	Rings removed (worn, broken or down)										Cylinder packing ring wear										Causes of cylinder ring removals		Engine miles per pt. of valve oil						
	Valve			Cylinder			Passenger			Total			Freight			Passenger			Total			Broken	Down	Worn	Total	Maximum	Minimum	Average	Total Engine mileage
	No. of roads	No. of engines	Total no.	Total ring miles	Av. mls. per ring	Total no.	Total ring miles	Av. mls. per ring	No. of rings considered	Total ring mileage	Passenger	Total	Per ring	Per 10,000 miles	Broked	Down	Worn	Total	Maximum	Minimum	Average	Total	Maximum	Minimum	Average	Total			
Hydrostatic	5	14	38	511,917	13,471	72	547,182	7,600	20	488,631	1,298 in.	.065 in.	.027 in.	32	20	20	72	49.1	15.9	30.5	711,060								
Mechanical	5	14	45	528,715	11,749	104	681,157	6,350	32	710,616	2,092 in.	.065 in.	.029 in.	18	28	58	104	101.8	21.4	50.6									
Freight																													
Hydrostatic	3	8	0	.....	.....	22	43,007	1,954	11	46,944	1,123 in.	.103 in.	.0239 in.	1	2	19	22	48.5	13.6	32.0	121,034						
Mechanical	3	8	0	25	65,004	2,600	15	68,738	1,357 in.	.090 in.	.0197 in.	1	5	19	25	42.9	12.6	26.7									
Passenger and Freight (Combined)																													
Hydrostatic	7	22	38	511,917	13,471	94	590,186	6,279	31	535,575	2,421 in.	.078 in.	.045 in.	33	22	39	94	49.1	13.6	31.1	832,094								
Mechanical	7	22	45	528,715	11,749	129	746,161	5,784	47	779,354	3,449 in.	.073 in.	.044 in.	19	33	77	129	108.1	12.6	40.7									

considerable interest, and as a general proposition is establishing a favorable impression. A total of seven roads co-operated with the committee in the pursuit of this subject. These reports embraced the comparative performance of hydrostatic versus force feed lubrication on a total of 22 locomotives. With the exception of four, these locomotives were equipped with hydrostatic oil delivery to one side and force feed delivery to the opposite side. The summarized results referred to, and from which some concep-

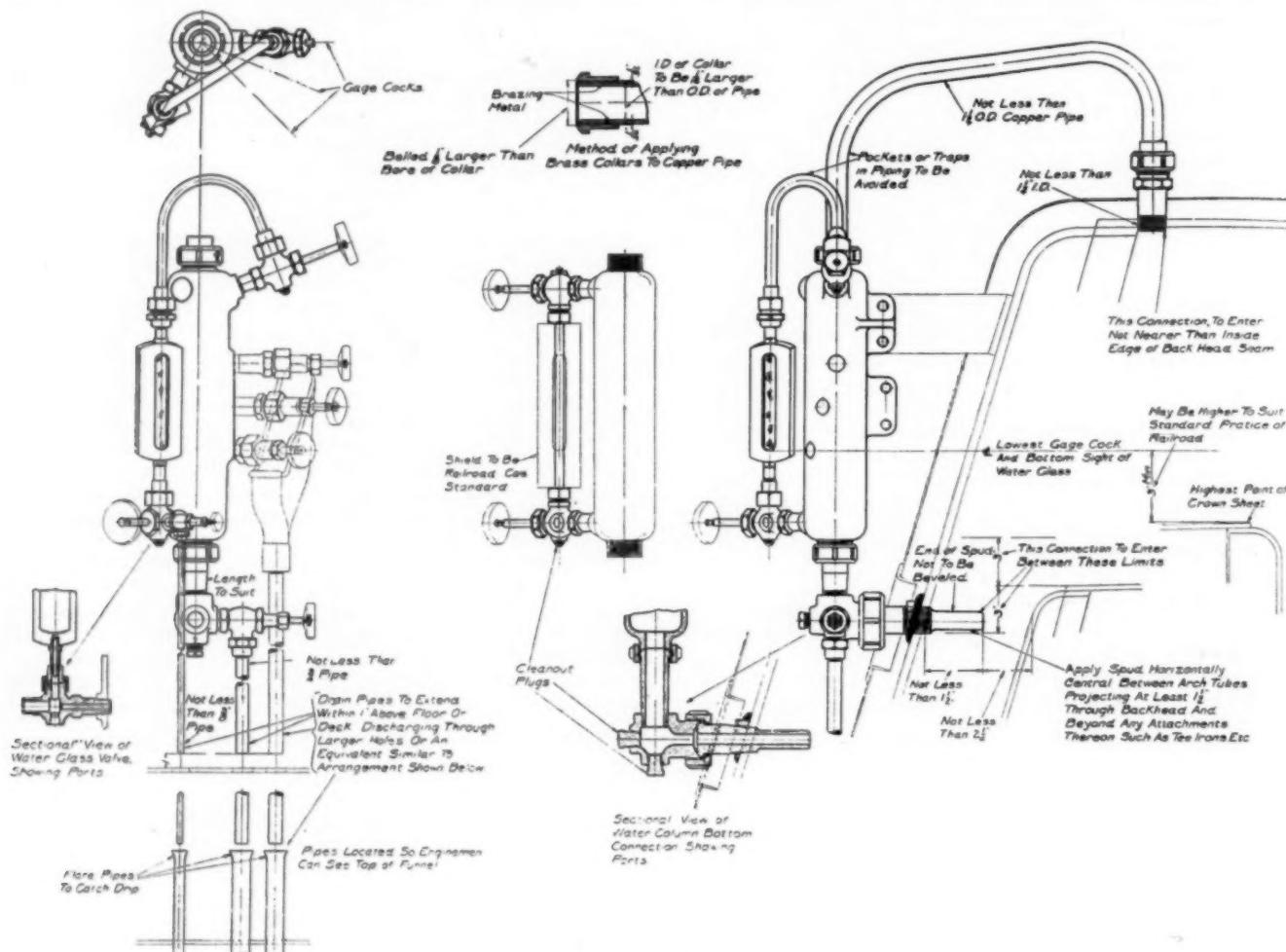
In freight service, there was a total of eight locomotives under observation. The performance of the valve packing rings was not sufficiently complete to enter into the comparison. Considering the cylinder packing rings there was a total of 22 removed from the hydrostatic and 25 from the force feed positions. The average mileage made by these packing rings was 1,954 and 2,600 for the hydrostatic and force feed lubricators respectively. Comparing the performance on the basis of the average radial ring wear per

10,000 miles, the record shows a rate of .239 in. and .197 in. for hydrostatic and force feed lubrication respectively. The mileage per pint of valve oil in freight service was favorable to the hydrostatic lubrication, 32 miles having been realized as against 26.7 for force feed lubrication. It is necessary to call attention to these individual values established in the comparison of the two methods of lubrication in order that a comprehensive idea of the results of this study as a whole may be obtained.

In passenger service a difference of 13.8 per cent in cylinder packing ring service in favor of hydrostatic lubrication is shown, while in freight service a difference of 33 per cent favorable to force feed lubrication is recorded. On the basis of radial cylinder packing ring wear per 10,000 miles service, the results from the two systems of lubrication are practically equal in passenger serv-

threads, suggested that in view of the disposition of the railroads and the association to adopt screw threads which do not conform to the Sellers or U. S. Standard tables, particularly for special purposes, such as boiler work, pipe work, injector couplings, etc., the statement on page L-27 of the Manual, to the effect that "The Sellers or Franklin Institute system of screw threads is the standard of the Association" should be qualified so as to avoid conflict between this statement and other standards and recommended practices which have been, or may be, adopted.

The committee feels that in the case of thin castle nuts, whose use, insofar as locomotives are concerned, is confined almost exclusively to crank pins, knuckle pins, crosshead pins, piston rods, etc., the form and number of threads per inch in the nuts should be governed by the threading of the parts to which they are applied.



Drawing Showing the Application of the Water Column to the Back Head

ice, while in freight service a difference of 17.6 per cent is shown favorable to force feed lubrication. Considering the mileage obtained per pint of valve oil, a difference of 65.9 per cent favorable to force feed lubrication in passenger service is shown, while in freight service the difference is 16.6 per cent, favorable to hydrostatic lubrication.

In the consideration of the performance record to which reference has just been made, no striking difference between the two systems of lubrication from any basis of comparison carries through both freight and passenger service. In passenger service a better valve and cylinder packing ring performance was obtained from hydrostatic lubrication, while a better mileage performance per pint of valve oil was secured from force feed system. In freight service a better cylinder packing ring performance was obtained from the force feed system, while a better mileage performance per pint of valve oil was obtained from the hydrostatic system. While there may be a slight difference favorable to force feed lubrication, the difference is not striking or particularly conclusive.

The committee, in reporting on the standardization of taps and dies and also on the accepted standards for bolt and screw

The committee also feels that the form of threads to be used for lubricator fittings should be definitely specified.

Attention has been called by the committee on Locomotive and Car Lighting to the fact that the association has no standards for bolts or machine screws smaller than $\frac{1}{4}$ in. diameter, which is the smallest size included in the Sellers or U. S. Standard tables. This committee has therefore undertaken the work of ascertaining the present practices of the various roads with regard to sizes and threading of machine screws.

Status of Standard Threads

Information has been received from 20 roads. Fifteen report having no standards of their own, but are either following, or recommend following, the A. S. M. E. standards. Three have adopted as standard a certain number of sizes which are included in the A. S. M. E. standards, but have not adopted the entire A. S. M. E. table. Two roads report having standards of their own which do not agree with the sizes and threading found in the A. S. M. E. tables. In view of the predominance of the A. S. M. E. sizes, it seems proper that the sizes and threads that are adopted for ma-

chine screws should be selected from the A. S. M. E. tables.

As the Operating Division has not yet appointed a committee to confer with this committee on engine failures a report of progress only is made. The following memorandum is submitted for discussion and with a view of obtaining the views of the members for the benefit of the committee for future consideration.

1—All delays waiting at initial terminal caused by some defective part of locomotive.

2—All delays on account of the locomotive breaking down, running hot, not steaming well, or having to reduce tonnage, on account of defective locomotive, making a delay at terminal, meeting point, junction connection or delaying other traffic.

The following will not be considered as locomotive failures:

(a) When locomotives lose time and afterwards regain it without delay to connections or other traffic.

(b) When a passenger or scheduled freight train is delayed from other causes, and a defective locomotive makes up more time than it loses on its own account.

(c) Delays to passenger trains when such delays are less than five minutes at terminals or junction points.

(d) Delays to scheduled freight trains when they are less than twenty minutes late at terminals or junction points.

(e) Delay when a locomotive is given tonnage in excess of rating and stalls on a grade, providing the locomotive is working and steaming well.

(f) Delays on extra freight trains if the run is made in less hours than the number of miles divided by ten.

(g) Locomotive steaming poorly or flues leaking on any run where a locomotive has been delayed (for other cause than defects of locomotive) on side tracks or on the road an unreasonable length of time, say fifteen hours or more, per 100 miles.

(h) Reasonable delay in cleaning fires and ash pans on the road.

(i) Failure of locomotives coming from outside points to shops for repairs, whether running light or hauling a train.

(j) Delays due to insufficient time having been allowed in which to make needed repairs or to get the locomotive ready for the time the train is ordered to leave, when the operating department was so advised at the time locomotive was ordered.

(k) Broken draft rigging on locomotives and tenders, caused by a bursting hose of the train breaking-in-two.

(l) Delays to fast scheduled trains when weather conditions are such that it is impossible to make time; providing the locomotive is working and steaming well.

(m) Delay due to the locomotive being out of fuel or water, caused by being held between fuel or water stations an unreasonable length of time.

Report on Standardization of Water Columns

In the report on the standardization of water columns the committee made a total of 28 recommendations for future installations which are as follows:

1. All water columns and water glasses must stand vertically.

2. The water column should not be less than three inches inside diameter and of sufficient length to accommodate the length of water glass required for the operating conditions and to have a clear opening for the top connection of not less than 1½ in. inside diameter and be connected to the boiler with not less than 1½ in. outside diameter copper pipe, tapped into the boiler on the top center or in a location not farther to the side than nine inches and not nearer than nine inches to the inside edge of the back head seam.

3. The top spud connection standard in the boiler to be not less than 1¼ in. inside diameter.

4. The bottom end of the column, to provide for vertical range in location, should be supported and connected to the boiler with a heavy cross connection and spud with clear straightway bored port ¾ in. diameter, with the cleaning plugs located opposite the horizontal and vertical ports. The spud should be of forged steel or bronze of ample strength to carry the weight of the column and attachments.

5. The bottom water column vertical connection to be not less than 1¼ in. inside diameter, preferably larger.

6. The back head of the sloping type may be reinforced with open hearth steel bevel washers, welded in place to provide horizontal application to the bottom spud.

7. The bottom spud must not be located in a radius or knuckle of the back head flange or immediately above the arch tube opening.

8. The inner end of the bottom spud must extend not less than 1½ inches through the back head and beyond any attachments thereon, such as the tee, angle iron, boiler braces, etc., to avoid location within a water eddy or pocket where water may dam up.

9. The inner end of the spud must not extend to or be less than 2¼ inches from the firebox door sheet and be located in a vertical range between 3 inches below and 3 inches above the back end of the firebox crown sheet.

10. The water column, vertical location, must be at such a height that the lowest gage cock attached therein, and the lowest visible reading of the water gage shall be not less than 3 inches above the highest part of the crown sheet and may be located higher, to suit the standard practice of any railroad.

11. The bottom connection of the water column must be equipped with not less than ¾ in. drain pipe and valve, preferably one-inch, which can be easily opened and closed by hand, so that the water column and connection may be frequently blown out. The drain pipes should be well braced and extend separately to within one inch of the cab floor or deck, and discharge the waste steam or water through a hole, slightly larger than the diameter of the pipe, or an equivalent arrangement whereby the leakage discharged through these pipes may be observed above the deck.

12. Water columns should be located well toward the center of the back head of the boiler to afford protection and to avoid violent fluctuation of the water while rounding curves. Extension handles to be applied to gage cocks when necessary, so as to bring them within easy reach of the engineman.

13. Gage cocks must be not less than ¼ in. inside diameter.

14. The top end of the water column should be securely braced to the back head with a brace sufficiently heavy to carry the weight of the column and overcome vibration.

15. The water column should be equipped with one water glass and three gage cocks.

16. The lowest reading of the water glass to be on line with the center of lowest gage cock.

17. The water glass of the Klinger or other Reflex type should have stems not less than ⅝ in. outside diameter and ⅜ in. inside diameter.

18. Tubular glass when used to be ⅝ in. outside diameter.

19. The top and bottom pipe connection to the water column and water glass must be applied without gaskets.

20. The water glass steam pipe connection not less than ½ in. outside diameter, preferably ⅝ in. outside diameter.

21. The water glass, Klinger or Reflex type, top and bottom valve connection bore ⅜ in. diameter, "and bottom connection provided with cleaning plug located opposite the vertical port and the side outlet for the blow off pipe connection."

22. The water glass, tubular type, top and bottom valve connection bore not less than ¼ in., preferably 5/16 in., "and bottom connection provided with cleaning plug located opposite the vertical port and the side outlet for the blow off pipe connection."

23. The water glass vision not less than six inches, preferably eight inches, depending on operating conditions.

24. The tubular type water glass when used must be equipped with a removable safety shield which will prevent glass from flying in case of breakage.

25. The water glass must be so located and maintained as to be quickly observable by the enginemen.

26. The water glass must be equipped with a bottom blowout valve and pipe not less than ⅜ in. diameter.

27. Steam pipes to be applied without sharp bends or pockets and provided with ball joint connections and belled at least ⅛ in. in diameter at the end in the bracing collar.

28. Application is shown by drawing.

Removable Hand Rail Columns

The committee submitted nine different designs of hand rail columns which provided for the ready removal of the hand rail. Local conditions, the position of the hand rails and the uncertainty as to a general demand for such a design suggested the presentation of several designs which embodied this special feature. The report recommended that individual railroads considering the use of a removable hand rail should be in position to select from the several designs submitted, one that would probably meet their requirements.

Locomotive Development

There has been a remarkable reawakening of interest in increasing the efficiency of the modern locomotive, with two main objects

in view; first, fuel economy, and second, increased utility of the machine.

While this movement is attributed by some to the demands of the general public, it is the committee's opinion that it has been brought about by the necessity of improving the locomotive to meet changing conditions of traffic and to keep pace with the great improvements in roadway, terminals and general industrial developments. Coincident with this, great interest has been aroused in fuel saving devices due to the increase in fuel costs, forcing engineers, particularly in foreign countries, to investigate the possibilities of the turbine and internal combustion locomotive. These developments and the building of heavy electrical locomotives have served as a means of advertising the shortcomings of the steam locomotive, unjustly, thereby preventing to a great extent, a realization of what is being done to increase the efficiency of the orthodox types of steam locomotives.

The body of the report contains a summary of the progress being made in steam locomotive development along conservative lines; it listed the major improvements to ordinary designs of locomotives, cited examples by which increased boiler capacity had been obtained, gave an account of the advantages obtained by the use of positive limited cut-off and the development of the three-cylinder locomotive. The report also reviewed the economies effected by changes in operating practices and their effect on steam locomotive design, the condensing turbine locomotive, and the high pressure water tube boiler type locomotive, of which the "Horatio Allen" of the Delaware & Hudson is a typical example. Comments were made on the McClellan water tube fire box locomotive on the New York, New Haven & Hartford and the possibilities of high pressure locomotives.

Part two of the report was devoted to a summary of developments on the internal combustion locomotive. It stated briefly the characteristics of the heavy oil engines and the various problems connected with the application of Diesel power to locomotive service. The report confined its summary to the developments in electrical and geared transmission. It concluded with a discussion of the advantages and disadvantages of the oil-electric locomotive.

The report was signed by H. T. Bentley (chairman), C. & N. W.; H. A. Hoke (vice-chairman), Penna.; A. Kearney, N. & W.; George McCormick, S. P.; W. L. Bean, N. Y., N. H. & H.; C. B. Young, C. B. & Q.; M. F. Cox, L. & N.; W. I. Cantley, Lehigh Valley; C. E. Brooks, C. N.; G. H. Emerson, B. & O.; H. H. Lanning, A. T. & S. F.; A. H. Fetters, U. P.; M. C. M. Hatch, M.-K.-T.; S. Zwight, N. P., and R. M. Brown, N. Y. C.

Discussion

V. L. Jones (N. Y., N. H. & H.): The first engine equipped with a McClellan firebox was built for the Boston & Maine, and, like anything else that is very much in its infancy, it had troubles. The New Haven purchased the next two in 1916. They were built on the designs furnished by James McClellan. These locomotives went into service at that time, but after a while developed some troubles primarily in the backhead tubes and combustion chamber. There was no provision at that time for any part of the construction to take the column stresses, and the tendency of the firebox to weave around, away from the tubes; in other words, the tubes had to act as water carriers and at the same time form the strength of the fireboxes. These two engines went into the shop in 1920. We rebuilt the backhead and the bottom of the combustion chamber tubes and put them back into service. Since then they have run right through, including the strike, and have only cost for the two fireboxes, about \$300 for maintenance from 1920 up to the present time.

A road test was run on those two locomotives which indicated that we were getting something better than 10 per cent in the way of overall efficiency, fuel and water, although we have had no accurate boiler test and were forced to run road tests where some errors crept in. We let the two engines go along for about four years to see whether or not we had the right idea, and then went to work in connection with the American Locomotive Company on the locomotive that is on exhibition during this convention. We were able with a new locomotive, of course, to start from the ground up and design new, whereas, with a rebuilt job there were naturally some limitations.

The troubles in the way of the backhead tubes were overcome by providing separate braces and taking away from the tubes any

other duty except simply to carry water and steam, and so placing them that they were able to weave around and expand and contract as much as they liked without interfering with the firebox strength in any way. This particular engine was primarily the U. S. R. A. light mountain type, and in order to avoid bringing in too many new features on one locomotive we confined all of the development work and the new features to the firebox construction and kept the machinery and the rest of the engine essentially the same as it was. We did, however, take advantage of the water tube construction and raised the pressure up to 250 lb. That necessitated stiffening up the rods and also required some modification of the valve gear, so that our valve motion in full gear cuts off at 70 per cent of the stroke instead of near 90 per cent. We have provided on this engine no auxiliary starting ports, and so far no difficulty has developed from the engine being slippery in getting out of holes with a heavy train.

The character of service that we have dictates the use of about a 69-in. driving wheel to move most of our main line freight for the simple reason that we have so much passenger business that the freight has to keep moving almost on a passenger schedule in order to keep out of the way. Otherwise, it would be outlawed and run up all sorts of expense. For that reason it may seem strange that a freight engine has a 27-in. by 30-in. cylinder and a 69-in. wheel. However, that is a matter of local conditions.

(Mr. Jones exhibited a number of slides showing the detailed construction of the McClellan firebox locomotive, accompanied by an explanation).

B. P. Flory (N. Y., O. & W.): Does it take any longer to wash out this boiler than it does an ordinary boiler? If so, about how much longer?

Mr. Jones: We find it takes no longer; if anything, it is a little quicker. There are other engines under the same conditions using the same water and performing the same service, but these engines are noticeably cleaner, especially in the small pocket area. In other words, they do not accumulate the scale as rapidly as the ordinary construction. We trace that to the circulation which is more rapid and has some scouring action. It takes, as a rule, about two-thirds of the time to wash out this style of boiler as the ordinary one, and we can get at some of the bottom corners a whole lot more readily.

H. H. Lanning (A. T. & S. F.): How is the operation of scaling the tubes performed and how frequently?

Mr. Jones: New England water is noticeably good, so that I can answer that question only from our own conditions. We have never had occasion as yet to clean any tubes. On the side tubes of the original engines we find a light 1/16-in. scale up at the top where the tubes bend into the drums. The rest of the tube is entirely clean.

We had hoped to have by this time real operating information in the way of fuel and water consumption, but there was not an opportunity to obtain the use of the dynamometer car. So I cannot refer you to actual test figures on this locomotive. But from information that we have kept right along it is apparent that we are getting probably about 15 per cent more for a given amount of weight and space. I say that advisedly until such a time as complete test data is available.

A. H. Fetters (U. P.): I should like to ask Mr. Jones if he has made any determination of front end flue gas temperatures.

Mr. Jones: Not on this particular engine. On the two original engines we get about 20 degrees more. From road tests we get a little lower flue gas temperature in the front and a little higher superheat.

Mr. Fetters: Is there any tendency of the flues to burn out on account of water leaving the surface due to rapid circulation?

Mr. Jones: No. Those engines carry their water better than the ordinary type.

Mr. Fetters: Any tendency to prime noticeable?

Mr. Jones: No.

G. S. Edmonds (D. & H.): I want to touch the high spots in the actual operation of the "Horatio Allen" more particularly at this time with reference to the 350 lb. boiler pressure. The locomotive is a cross compound, and that at the present time is somewhat novel in locomotive practice in America. Remember, that in the firebox of this particular locomotive we have 57 per cent of the total evaporation surface and roughly evaporation surface in the firebox of the average locomotive boiler will range from five to ten per cent of the total. This engine was delivered to us last June. The boiler to date, for maintenance, has not involved an expenditure I should say to exceed \$50. Four staybolts in the

throat sheet have given us some little trouble from leakage. We did not put flexible bolts in these headers. Therein I think we made a mistake. We have taken out two of those bolts and the troubles have ceased. There remain two more to take out. The tubes which connect the upper and lower drums have not given us even a simmer, to say nothing of leakage, and during the last winter this locomotive operated in a territory where the temperatures were 15 deg. below zero and the snow was heavy. It takes a little longer to wash this boiler than normal. I should say it takes about two hours longer. We run the cleaner through all the tubes at each wash-out. Our practice is to blow out the flues at each end of the run. We started an experiment; we first ran the locomotive one month without blowing out the flues. They were then washed out. This practice was followed for a month or two and then instructions were issued not to blow or wash the flues until the indications showed that it was necessary. These flues have been run three months without blowing, and that in itself is an item worthy of consideration. It was found that the engine carries water equally well if not better than the normal locomotive.

Unfortunately, there were no precedents to govern the design and as received the locomotive was somewhat heavier than the specifications, which necessitates running it at lower speeds than our other locomotives. The highest normal operating speed is 25 miles an hour, with the limitation of 30 miles an hour. Notwithstanding these speed limitations which are strictly adhered to, this locomotive gets over the division much more rapidly than the other locomotives.

The results with the high boiler pressure make me very firmly feel that the day is not far distant when high pressures will become the predominating, or at least one of the predominating characteristics of American locomotives. From my observations, a 350 lb. or higher pressure will put our Pacifics up into what is now the Mountain type class.

J. Purcell (A. T. & S. F.): Did your cylinders give you any trouble with high pressure?

Mr. Edmonds: When the locomotive was first received from the builders it had a special bull ring and special packing. It made two trips, after which it was sent back to the builders, and the cylinders were bored out and Hunt-Spiller rings were applied to the high and low pressure cylinders. There has been one set of packing put in the locomotive since these changes. The piston rods and the valve stems are very tight and the lubrication gives no trouble. The cylinder heads were removed about six weeks ago and the walls looked the same as a normal engine.

Mr. Purcell: Do the piston rods give you any trouble?

Mr. Edmonds: No.

Mr. Purcell: Do your crank pins give you any trouble from heating?

Mr. Edmonds: The crank pins do not give us any trouble. I see you want to know what troubles we are having. The major trouble that we have been having with this locomotive recently is a pound in the main boxes. We made a change from the original boxes received and put in, what in our judgment, was the best driving box available for the purpose today. That box has not stood up, so we made a very careful study of the problem, not only as to the American but also as to the foreign practice, and we have developed a box which, in our judgment, will overcome the trouble.

Mr. Purcell: How many miles has this locomotive made?

Mr. Edmonds: She has made now between 20,000 and 25,000 miles.

Mr. Purcell: Have you developed any flat spots in the tires?

Mr. Edmonds: No, she shows no such indications.

Mr. Purcell: Have you made a dynamometer test yet?

Mr. Edmonds: We have had the dynamometer back of her, but we have not made exhaustive tests. The normal engine takes coal at Delanson going north and Delanson going south, which is some 60 or 65 miles out of Oneonta. This engine has been making trips from Oneonta and back without taking coal. We have got this engine rated slightly above our normal engine. We have had on her slightly below 3,500 tons on an .8 per cent grade.

Mr. Brooks: It seems reasonable to suppose that with pressures as high as 350 lb. we can probably use a two-stage engine such as you are doing, Mr. Edmonds, but when you get up into the range of from 600 to 1,200 lb. pressure you must go beyond that. Not only will you have to go to a multi-stage engine, but you will have to go to those devices which will rejuvenate the steam in between stages as well, and that means severe complication.

Grafton Greenough (Baldwin Locomotive Works): I believe we are all working along with the idea of seeing what is best to do, because the locomotive industry cannot stand still. We can't build engines much wider or higher without rebuilding our entire transportation system, and it is necessary to get more power and more efficiency in a given space. The high pressure boiler is certainly one of the objects that is well worth while to strive for, and I think the work that is going on is valuable not only for the present but for the future of the industry.

C. A. Seley (Locomotive Firebox Company): The amount of superheat, however, as stated in this report is 300 deg. F., which, I take it, is additional to the normal steam temperature.

I have recently had some correspondence with the technical department of an engine building firm in Germany, and in the course of that correspondence the question of superheat came up and the statement was made that for a good engine they considered 660 deg. F. as a necessary steam temperature. The temperature of 200 lb. steam, our general average, is 387 deg. F. If we add 300 deg., as recommended by the committee, that makes a total of 687 deg., which is somewhat higher than the recommended German practice. I am of the opinion that the general practice of our country is below rather than above that of Germany. I think we will find ordinarily 200 deg. superheat is more nearly the average used, bringing up the temperature to 587 deg.

This is speaking in averages and not extremes, as the German practice would run from 725 deg. down. If 200 deg. superheat is added to the average already reached you will easily get a maximum of 620 or 630 deg. at times.

I might say one word further in regard to the actual status of superheat that we obtain. We can figure theoretically what we want on the locomotive in point of superheat, and put in the equipment, but what you get is something possibly different, due to the fact that in arranging the front end devices and making other adjustments in arriving at the diameter of the stack and of the nozzle, we have in mind only the proper combustion as the end to be obtained; to burn a level fire and to produce the necessary draft without extreme back pressure.

I am of the opinion, therefore, that the superheat of 300 deg., as recommended by the committee, should be defined, whether an average or a maximum, and if an average whether we should not more nearly follow our general practice.

Mr. Brooks: In reply to Mr. Seley's remarks, I would briefly state as follows: Today we are buying locomotives with supposedly 200 deg. of superheat. If we were to consider that this is the average degree of superheat we were getting, there would be something wrong with us, because we are not getting anything like that, and all you have to do is get the pyrometer on any modern locomotive and you will find that this degree of superheat which we are guaranteed by the builders and by the superheater company when we buy the equipment, we are not getting it on an average. I would say that under average operating conditions in freight service we are not getting on a supposedly 200 deg. superheat locomotive over 135 deg. of superheat.

When this committee points out that we should consider a higher degree of superheat than 250 to 300 deg. we are trying to indicate that we should get or strive for at least 100 deg. more than we have in the past because we know that we are not getting what we thought we were in the past, and it simply is an added mark and something which will give us increased efficiency.

We do not figure that we should obtain this 300 deg. of superheat by increasing the smoke box temperature abnormally. We believe that good combustion means a smoke box temperature of probably 550 deg. F., and we believe, in addition, that instead of trailing along with 125 or 135 deg. of superheat under average operating conditions, the average should come up to 225 or 250 deg., and that our maximum may go even as high as 350 deg. without any serious trouble.

G. S. Goodwin (C. R. I. & P.): Should the maximum superheat be based on the point at which you would not waste any superheat out of the exhaust? Isn't that the point that we want to work to—to overcome condensation?

Mr. Brooks: Tests which we have witnessed during the past year on modern power where our superheat has been about 235 to 240 deg. we have noticed under those particular conditions probably ten to fifteen deg. of superheat going over in the exhaust and the first indication that probably any of us got of that was from the temperature of water that the feedwater heater delivered to the boiler.

I do not believe that anybody could say definitely today just

what that dividing point is that you are looking for. I believe that we can go to a much higher average superheat than we are going today without losing any abnormal amount of superheat in the exhaust. A few degrees, up to possibly 10 deg. of superheat in the exhaust I do not believe will do any of us much harm.

Prof. R. E. Endsley (University of Pittsburgh): Just a word about the amount of superheat going out of the exhaust. Get all the superheat that you can lubricate, and then the amount going out of the exhaust will be added to by the increased volume of the steam as it enters the cylinder. You take steam at 200 lb. pressure; it occupies a certain volume. Superheated steam at 200 degrees does not fill anywhere near that same space. Add another 100 deg., and then exhaust 50 deg. and you are going to gain from the increased volume. So get all the superheat that you can lubricate and get the maximum efficiency.

Water Columns

A. H. Fetters (Union Pacific): I would like to suggest that in the illustration in the report showing the water column the lugs be changed from the horizontal hold type to the vertical hold type as a number of roads have experienced considerable trouble with the shearing of the bolts. Changing to the ledge or vertical bolts takes the shear off the bolts. That column is pretty heavy, and the usual $\frac{1}{2}$ in. or $\frac{5}{8}$ in. bolts won't stand up. Vertical bolts make just as good security and they are relieved from that shearing strain.

A. G. Trumbull (Erie): I would like to suggest for the consideration of the committee that the design as shown with the bottom connection as indicated is very likely to be stopped up if any sludge accumulates on the bottom of the column. It seems

to me it might be preferable if that connection were made in such a way as to provide a mud pocket below the lower connection. That might be accomplished by making the connection above the bottom of the column. It seems to me highly important, especially for those railroads which have bad water conditions to contend with.

Mr. Bentley: I think a lot of us have had experience with the suggestion to roll the pipe over the end collar which is known as the mechanical joint, and if my experience is like anybody else's it is a very unsatisfactory arrangement. In regard to the flanges instead of the nuts, I believe the suggestion is an excellent one. The use of nuts around an engine on steam or water connections is obsolete, for they always give trouble. With a bolt and flange connection practically all of that trouble is overcome.

Mr. Lanning: From the standpoint of our own experience we think the manufacturers still have something to work out in connection with the construction of a lubricator. Several of them have succeeded so far in building lubricators that will feed oil provided conditions are right, that is, if the temperature is correct. That is the principal item, but I don't think any of them have taken any definite steps toward automatic means for controlling the temperature of the oil as I think they are going to have to do before the force feed lubricator will become an ultimate success. The report here points out some of the features for making temperature control desirable. I think the railroads will have to work out for themselves the matter of the proper drive for the lubricator.

(*It was moved and seconded that the report be received and that the committee be continued for another year. The motion was carried.*)

The Conservation of Fuel

Improved mechanical devices make possible a reduction of locomotive fuel costs

By F. H. Hammil

Executive Vice-president, C. R. I. & P.

The following is an abstract of an address by F. H. Hammill, executive vice-president, C. R. I. & P. on the subject of fuel conservation.

The public is getting pretty critical about how we operate railroads. I have heard President Aishton of this Association say that we are going to be called upon to show whether or not we operate the railroads efficiently. And one of the big problems is what you are doing in locomotive performance; are you doing it cheaply or not.

I drew up some figures that I think are rather gratifying. It shows some things that have been accomplished. I find that on the Class 1 railroads in freight and passenger service in 1924 as compared with 1920 there was an increase of 4.4 per cent in gross ton miles, or an increase of 40 billion ton miles.

In doing that there was a decrease of 9,000,000 net tons of coal consumed, or 10 per cent. There was a decrease of \$132,000,000, or 35 per cent. There was a decrease from 197 lb. of coal per 1,000 gross ton miles in 1920 to 149 lb. in 1924, or a decrease of 24.4 per cent.

In passenger service there was an increase of 1.4 per cent in passenger car miles with a decrease of coal consumed of 8.6 per cent; a decrease of 9.6 per cent in pounds of coal per passenger car mile.

Taking the two services together we find that in the five-year period there was a total decrease of 9.6 per cent in amount of coal consumed, or 11,900,000 tons. There was a decrease in cost of coal of \$180,000,000 or 34.8 per cent. That speaks fine for the mechanical men. The operating man is responsible for the coal. I know at one time it was quite the vogue to make the mechanical man absolutely responsible for the consumption of coal. I take a different position from that. I think the operating man should go with the mechanical man to the limit on the responsibility for that performance.

In the work of the joint committee of the American Railway Association and the International Railway Fuel Association on coal conservation we have been giving quite a little study recently to whether we had gone as far as we ought to as a joint proposition. We are going to win or lose as a transportation machine, not as individual railroads, but on whether we delivered the goods as transportation men. We all know what we have done so far as individual railroads in looking after this coal conservation. The question in the minds of the committee is, shouldn't we do something as a joint proposition. One of the things that I want to call your attention to is this: There were some very fine papers prepared on the question of fuel economy in book form. We find through the committee on coal conservation that they were not distributed as much as we on the committee feel would be of value to the railroads. I would like to call your attention to that so you may look into it.

The next thing is, should we adopt some method of unified testing. We make tests on our various railroads. There is a question in the minds of the committee if it is not necessary for us to go beyond that, not only to defend ourselves in connection with rates and in connection with our transportation as a whole but also to help us to bring about the results we ourselves consider necessary.

Our committee has made a recommendation to the A. R. A. as to whether we should not avail ourselves of some of these colleges that have good testing plants so we can get some universal information. We all know what the superheat has done for the locomotive. We have other appliances that we know about. If we had some plan of that kind, couldn't we get more detailed information?

We ought to get our problems before the people just the same as other groups get their problems before them. If I have any criticism to offer at all about the transportation business

it is that we have been a little too prone to lay back and not talk our subject. The time has come when we should talk.

At the Illinois State University, at Purdue and I think also at Iowa State College are good testing plants. If we could get together as an Association and work out some plan of utilizing these plants we would not only develop the information for the railroads as a whole but we would come in contact with the boy

getting his education. He goes back home and gets into some little argument there about the railroads, how they are conducted and whether they are properly conducted. The boy says, "I think they are because right at the present time at the Illinois University where I am going we have locomotives there testing them out. Why? So as to reduce coal costs and enable the railroads to operate as cheaply as they can."

Report on Locomotive Utilization

Joint committee formulates ten principles followed where best results are obtained

The Joint Committee on Utilization of Locomotives presents herewith a report of progress. The committee has collected and analyzed considerable data on this subject, and has conducted some field surveys of operating conditions and performance. From this study, it is evident that the railroads generally are fully alive to the importance of this subject, and very creditable performance is being made.

The performance indicated by these surveys and studies of the Committee is as a result of the careful application of the following principles:

1—Locomotives are given such maintenance attention at monthly periods, preferably at certificate time, to condition the locomotive to run to the next monthly repair time with the minimum of light running repairs. This plan reduces materially the average mechanical time held at terminals, is a great factor in reducing engine failures, and provides a definite plan of running maintenance for keeping the locomotive in better condition.

2—Detailed analysis of operating conditions on each division is made to determine the practicability and economy of increasing the miles per locomotive despatchment. The ability and capacity of modern locomotives to make long sustained runs successfully has been definitely established.

3—Methods pursued in placing locomotives in and withdrawing locomotives from reserve, are very carefully worked out and adhered to. Consideration is given to placing this on miles per day basis, and placing the responsibility therefor on the division people. Specified miles per day are established for all classes of service for each division. Authority and responsibility is definitely placed on the division trainmaster and master mechanic for the number of locomotives in service to maintain this mileage.

4—Time for initial and final terminal delay at each point is established. Consideration is given to the location of route between engine house and yard, and interference encountered in this movement. Consideration is also given to relatively low cost capital investment improvements that will expedite this movement. Definite responsibility is also placed for the maintenance or improvement of this established figure with a local transportation officer.

5—The maintenance of specific locomotives is assigned to specific engine houses, and the utilization of inadequately equipped terminal facilities for turn-around purposes only.

6—Methods followed at yard offices in computing train loading and supervision held responsible therefor is also carefully investigated and studied. This matter is also followed up by the operating officers.

7—Consideration is also being given to re-location of or additional fuel and water facilities with reference to stops fouling the yard or cross-over switches, the location of these facilities with reference to the main tracks and the development of plans predicated on extended runs for correct location of facilities.

8—Statistics relating to performance of locomotives are carefully maintained and studied as relating to average miles per locomotive per month, gross ton miles per train mile, gross ton miles per train hour and related transportation statistics.

9—Thorough consideration is given to the reduction of freight train road delays with reference to despatching, spacing, overtime, relatively low capital investment improvements, and the method of supervising outlying points where congestion often exists and points where fuel and water are obtained.

10—Prior classification is obtained as far as possible and restriction of pick-ups and set-offs reduced to a minimum number of trains.

Where the greatest utilization of locomotives is obtained, and the best performance found, the above principles are being applied by operating officers on each division. Also, the operating and mechanical officers of the entire railroad are displaying the greatest interest in the subject. The committee invites suggestions and information as to the other practices which have been found effective by the members.

Upon request, executive officers of railroads will be supplied with confidential copy of reports of field surveys made by the committee.

[Attached to the report were tabulations of condensed operating statistics of a selected number of roads and of all Class I roads.—Editor.]

The report is signed by the following:

Representing Operating Division: T. B. Hamilton, vice-president, Pennsylvania; J. T. Gillick, general manager, Chicago, Milwaukee & St. Paul, and A. E. Ruffer, transportation manager, Erie.

Representing Mechanical Division: W. H. Flynn, superintendent motive power, New York Central; W. H. Fetner, chief mechanical officer, Missouri Pacific, and O. S. Jackson, superintendent motive power and machinery, Union Pacific.

Discussion

O. S. Jackson (U. P.): On roads like the Union Pacific, where 33 per cent of the value of all rolling stock is invested in locomotives, or to put it another way, where 6 per cent of the value of the entire property, including lands, buildings, etc., is invested in locomotives, it is of the utmost importance that this equipment be kept moving. It has been the tendency in the past, to meet increased traffic conditions by purchasing new locomotives without first endeavoring to get maximum utilization out of those we have.

To effect a maximum utilization of power, certain principles of maintenance and operation are essential, and these have been brought to your attention in the progress report.

Reference has been made in this report to a method, or system, of making repairs periodically. We have adopted this system on the Union Pacific with splendid results. Locomotives are in better condition, as reflected by a notable reduction in the number of engine failures—the figures per 100,000 locomotive miles being as follows:

Year 1920—3.57 failures
Year 1921—2.10 failures
Year 1922—3.29 failures
Year 1923—1.54 failures
Year 1924—1.11 failures

Since the adoption of this plan we find that our maintenance costs have also been reduced. While we do not consider that the plan itself is entirely responsible for this, we do feel that it has had an influence on the reduction in costs for running repairs. It is also a factor in increasing the mileage between general overhauling.

The plan, briefly, is this: When a locomotive is due for the regular monthly inspection required by the Federal law, it is

held long enough to be given such attention as is necessary to put it in condition to perform satisfactory service until the next monthly Federal inspection is due. This work is handled along definite lines and under certain prescribed rules and instructions for each engine held, depending on its condition, length of time out of shop, class of service, etc.

With the ordinary trip inspections and ordinary light running repairs during the intervening time, locomotives can be, and are, put in condition to operate successfully between monthly inspections.

Results from Long Locomotive Runs

The next item in the progress report of the Joint Committee is the practicability and economy of increasing the miles per locomotive despatched. This is generally acknowledged to be a very important item. At the time the subject was under discussion at the 1923 convention, I stated that the operation of long locomotive runs on the Union Pacific was no longer in the experimental stage; that we had been able to reduce our locomotive active assignment by about 25 per cent as a result of this method of operation, and, at the same time had effected a large reduction in the terminal time of locomotives.

As a result of our experience, we have extended this method of operation until we have all main line power, both freight and passenger, assigned to long runs. The only exceptions are the local and branch trains. Our passenger locomotives are now assigned to runs from 483 to 640 miles in length and freight locomotives from 225 to 337 miles.

From an economical standpoint this method of operation has met our fullest expectation; the saving in locomotive investment and in intermediate terminal improvements and maintenance, and the reduction in the amount of fuel used at intermediate terminals, represents a large saving in our operating costs.

We find, in addition to the saving in fuel used on locomotives at intermediate terminals, that we have also been able to make a considerable reduction in the amount of coal used in the power plants at these terminals. One of the most recent examples of this was the running of freight engines through Rawlins, Wyoming. By running engines through from Green River to Laramie, there was a reduction in the amount of coal consumed in the power plant at Rawlins of as much as 540 tons per month, with practically no increase in the amount used at Laramie or Green River.

The experience of the Union Pacific along these lines is not unique, as I find from the field survey made by the Committee on at least one other railroad, that the same favorable results have been obtained by means of long locomotive runs.

Storing Locomotives Due to Fluctuations in Traffic

With reference to the 3rd item of the Committee's report—placing locomotives in reserve. On a road like the Union Pacific, where there is an enormous fluctuation in freight business due to seasonable traffic, it is absolutely necessary to exercise close supervision over the number of active engines in the assignment. For example, our variation in traffic in the year 1923, was at the ratio of 100 in the lowest month to 237 in the peak month.

In order to keep the assignment of freight locomotives lined up in accordance with traffic conditions, an expected daily mileage per assigned locomotive is specified, and locomotives must be withdrawn from the assignment and stored as quickly as this specified mileage cannot be obtained. We rely entirely on our division officers to keep the assignment down, and require that the average mileage obtained per assigned locomotive be shown each day on the morning operating report.

The committee also mentions one other factor, and that is the necessity for *careful study of statistics* with a view of following up performance so that possible maximum efficiency in the utilization of power can be obtained.

J. M. Nicholson (A. T. & S. F.): The tabulated data for 26 of the larger Class I roads which is attached to the progress report shows that 13 railroads increased the miles per day per active freight locomotive for the year of 1924 compared with 1923, and that 13 roads showed a decrease. In passenger service 16 of the roads listed showed an increase in miles per locomotive per day per active locomotive and 10 of the roads showed a decrease. The maximum average miles per day per active freight

locomotive was 116.7 and the minimum was 61.9 miles. The maximum average miles per day per active passenger locomotive was 277.9 while the minimum was 108.5 miles. This shows considerable variation between the maximum and minimum average miles per day. The high average miles per day in both freight and passenger service shown in the report is made by a railroad having a high percentage of their locomotives on extended runs over more than one operating district.

It is generally realized that the modern locomotive is capable of making a greater mileage per month than is made by the individual engine crew. It is also generally conceded that the locomotive is capable of making a greater mileage per dispatch than is regularly run by engine crews. These conditions have resulted in the general pooling of power on many railroads and in later years the extended locomotive runs have greatly increased the miles per dispatchment.

The investigation of the committee shows that a mileage of from 11,000 to 12,000 miles per month for passenger locomotives and a mileage of from 5,000 to 6,000 miles per month for freight locomotives is being made on portions of certain railroads. This mileage is resulting where locomotives are in productive service approximately 50 per cent of the time.

Locomotives are being turned at terminals on some railroads operating extended runs, in 12 hours terminal time, which is divided approximately 8 hours for mechanical attention and 4 hours for transportation delay awaiting trains. If this is the necessary amount of time, a greater locomotive utilization will result if a reduction of terminal time in excess of this amount can be effected.

This analysis may reveal that extended run, operation, turn-around run operation in pooled service or regular assigned engines will result in the greatest utilization of locomotives on a certain territory. All of the roads investigated by the committee have a certain amount of branch line and local service which makes a low mileage per day and the service is such that the maximum utilization of locomotives is secured by regular assigned locomotives. Certain divisions have conditions where pooled locomotive operation on a single district with turntable attention at one end of the district and maintenance repairs at the other end is resulting in good utilization of locomotives. The best utilization of locomotives is being made on extended runs over more than one operating division and this operation is recommended by the committee where practical.

Co-operation Between Enginehouse Foreman and Transportation Department

A frequent exchange of information as to power that will be ready and trains to be run is important and close co-operation between the roundhouse foreman and the transportation department representatives is necessary to maintain power efficiently. Greater utilization of locomotives can be secured if the roundhouse foreman knows that certain of the locomotives in his terminal will not be used for from twelve to fifteen hours. This amount of time will enable him to make repairs during the lay-over that otherwise would require holding the locomotive out of service on the next trip.

On many western roads it is necessary to wash the boiler after each trip, or in some cases, each round trip. The time required to wash the boiler is usually the governing factor in time required to turn the locomotive which makes it important that this time be reduced to a minimum. Roads that have good water conditions, which results in less frequent boiler washing, can be expected to get a greater utilization out of their locomotives, than roads operating in bad water territories.

Any program which is worked out to increase the utilization of locomotives must give the greatest number of hours of productive service or mileage per month with the minimum of terminal time undergoing repairs and delay waiting trains. Increasing the hours of service will decrease the number of hours the locomotive is in the terminals which will permit a larger handling of locomotives with existing roundhouses. A study of each railroad as recommended may facilitate the movement of a considerable increase in business without additional expenditure for locomotives or facilities.

F. W. Byington (C. & N. W.): During the recent field survey made by the Sub-Committee on Utilization of Locomotives in connection with long engine runs on the Union Pacific and Santa Fe, it was observed that the train schedules on both pas-

senger and freight on both of these roads was maintained with reasonable regularity.

The passenger trains upon which we had occasion to ride, maintained schedule time and train sheet records indicated that this performance was quite regular.

It was observed that general conditions, such as water, quality of fuel, location of coal and water stations, various destinations of freight trains, switching of same for districts or junction points, have a great deal to do with the opportunities and advantages of running engines over two or more freight crew districts. The same is true on passenger runs as regards condition of water, fuel, location of coal and water stations.

On the C. & N. W. passenger engines have been operated through one or two engine terminals for a number of years; the same is true of freight runs. In the district between Chicago and Milwaukee however, which is a heavy passenger traffic district, a distance of 90 miles, and where the majority of our runs operate only between these two cities, it is only possible to make a round trip of 180 miles per day. Engines on through passenger runs, however, operate through Milwaukee on several runs.

Passenger engines on the C. & N. W. are, in certain districts, now operating through one or more engine terminals aggregating a distance of from 210 to 350 miles. Freight engines are also running over two freight crew districts on three important time freight districts, with a through mileage of from 200 to 237 miles. All of these long engine runs have been in practice for several years and the result has been generally satisfactory.

All districts on the Northwestern, as is true on many other roads, are not adapted for extended runs due to various conditions. However, advantage is taken in every possible instance to establish practicable long engine runs. On our line we have innumerable short schedule runs for both passenger and freight, due to traffic conditions, which has a tendency to permit only the ordinary turn-around operation. This situation is particularly true on three of our heavy traffic divisions out of Chicago and materially reduces our average engine mileage.

Economy may be effected in the practice of extended engine runs where conditions are suitable. There is one very important feature that must not be overlooked in connection with extended engine runs and that is the mechanical department must be given an opportunity to do the necessary work on the engines that same may be in good condition on the start off on each trip.

G. E. Parks (Michigan Central) discussed in detail the important items of engine terminal facilities which should be given consideration in order to make possible the greatest utilization of locomotives.

C. N. Hamilton (Penna.): There is a lot to be done in this work and the two most important things, as I see them from an operating standpoint, are long runs and proper maintenance of locomotives. Despatching also has something to do with it.

Another point that has not been touched on which I think is important is the co-operation between the operating department and the mechanical department—especially the enginehouse department.

Effect of Water, Fuel and Weather Conditions

Mr. Bentley: Some of those who are talking about 700 and 800-mile runs probably have got conditions which enable them to make those runs and to make them satisfactorily. We have got to take into consideration the water and fuel situation and the weather. I suppose in the South the longer runs can be more satisfactorily made in the winter time than they can be handled in the winter time up North. As to facilities, we have got to do the best we can with what we have got, in the majority of cases.

Some railroads having no suburban service are able to make a much better showing than those who are handling a large suburban service, so that in making your comparisons those things have got to be taken into consideration. We have, I presume, on the Northwestern more branch lines than probably any railroad in this vicinity and that also reduces the average miles per locomotive. Everything that has been said about maintaining the power has my hearty support. You can't get results unless your power is in good condition, and we have had that in mind for a good many years.

Where we used to think 10,000 miles per engine failure was pretty good we have gradually improved to such a point that

now we are making from 75,000 to 120,000 miles per engine failure, and there is no question that that has brought about a great reduction in the amount of fuel consumed, given better satisfaction to the traveling public and been better for the men who are operating the locomotives.

The question of coaling facilities on main lines is something that has got to be taken into consideration with a long run proposition. If you have got proper coaling facilities you can make longer runs.

C. E. Chambers (C. of N. J.): I only want to add my voice of approval. There is no question about the real economy of long runs for locomotives. It costs only a trifle more to get an engine ready to make a 300-mile trip than a 50-mile trip. However, most of our service is confined to from 90 to 125 miles, or in the case of a turn around, about 270 miles per day. So it is simply a matter of no choice on our line.

The coal factor is one of the prime elements in the long runs made by locomotives. Today with the large grate surfaces it is a matter that is much more easily handled than years ago on smaller power. So water, coal and the opportunity are three things you must have to make long engine miles.

Long Locomotive Runs

Have Proven to Be Economical

J. Purcell (A. T. & S. F.): What Mr. Chambers said is quite true. If you operate these locomotives through on the long runs you are going to decrease the amount of power that is required to handle regular trains. We have been running engines from 349 to 600 miles for a year or two and we find that there are several advantages. One is that we have less fire box, flue and staybolt failures than we had before.

In addition considerable fuel is saved in firing up, and that is one of the most important points of saving in utilization of locomotives. Save fuel while you are saving time in handling at the terminal.

In designing new power, if you get a good boiler, a 110 per cent boiler, and a good fire box heating surface, you are going to save fuel and maintenance repairs.

W. H. Fetner (M. P.): Long runs have been discussed a great deal prior to this time and a great deal has been said about it at this time. But it goes without saying that where water and other conditions will permit, the longer runs have certainly proved the most economical and will enable us to utilize a locomotive to better advantage more of the time.

I recently had an opportunity to place a few locomotives on a long run, nearly 500 miles, instead of cutting out twice and running over three divisions. This 500-mile run has resulted in the locomotives assigned to that particular run making 10,000 miles per month against the average miles on the same run of 5,000. Now, we have saved in that long run the cut-out time for two terminals, and putting it at the minimum of eight hours total transportation and mechanical, and considering the fuel necessary, it is an easy matter to figure what has been saved as a result of those longer runs.

Chairman Tatum: Mr. Fetner, haven't you been trying out some scheme in conditioning your locomotives about once a month on your railroad on a line somewhat similar to what Mr. Jackson is doing on the Union Pacific?

Mr. Fetner: Yes, but not to the extent that Mr. Jackson has done. It would be of value if he would go into the details of just what he is doing.

Mr. Jackson: We have a schedule on which our engines come in for the monthly federal inspection which we try to arrange so we will not have a great number of engines in on any one day. As the engines come in to undergo these monthly repairs we have a very careful inspection made—more so than the ordinary inspection that is made after each trip. This work then is assigned to men specialized on the different classes of work. By so doing this we get much greater efficiency from our men and we get better work done on the engines. We find that we maintain our power in better condition than we formerly did with the practice of doing the jobs each trip as the engine came in, distributing it throughout the thirty days. Our forms for this inspection have been given to the sub-committee.

Mr. Nicholson: The matter of handling periodic repairs on the Union Pacific will be fully covered in the progress report referred to in the committee's report, and it is going to be available to the A. R. A. as a confidential report.

Report on Electric Rolling Stock

Future possibilities of steam and electric locomotives—Shop facilities required for electric motive power

As a preface to last year's report, the committee offered under the title of Outline for Future Work, a general discussion of the economies of electrification as applied to existing steam operated railroads. Among the things exploited was the place held by the locomotive in railroad service with the possibility for more intensive operation and greater availability for service from motive power when proper study, planning and methods are applied. With that thought in mind it is well to consider means for obtaining maximum utilization.

A complete consideration must also include terminal electrification and the relative advantages of multiple unit train operation as compared with locomotive operation where such equipment is adoptable.

When the performance records of steam locomotives are reviewed over a considerable period of years with respect to availability for service, there seems to be indicated a retarding influence contemporary with the development of refinements and the increase in haulage capacity. These performance records further indicate that, whereas, the simple type of steam locomotive, as used some 25 years ago, was available for service approximately 75 per cent of the time, the modern steam locomotive seldom produces an average greater than 45 per cent. While obviously the addition of appurtenances and refinements, all of which improve the operating performance of the unit, will increase the amount of attention necessary to keep the locomotive in running order, yet, the decrease in service rendered cannot all be charged against such refinements. It would seem likely that a large percentage may be due to neglect in providing shop and terminal facilities in keeping with the requirements of the improved and larger power. Or perhaps the high percentage of unserviceable time may be due to a deficient understanding of the possibilities of the modern locomotive with its larger grate area, boiler dimension, general increase in proportions, and therefore greater margin of capacity as compared with designs of former years. Were these possibilities fully appreciated, then there would seem to be no logical reason for not providing and utilizing those facilities necessary for the prompt performance of shop and terminal work and thus obtain the maximum mileage performance between shoppings or terminal attention. Again precedent oftentimes places unnecessary restrictions on the realization of the wider range of service capacity of the modern locomotive, particularly where it is operated on the same division with power of a less recent design.

While it may appear inappropriate to dwell on deficiencies of the steam locomotive, nevertheless it is upon these deficiencies that great stress is placed by the proponents of electrification when the latter is under consideration. Such deficiencies should be taken into consideration by any road contemplating electrification and it seems only proper that cognizance be taken of them in this report. An outstanding advantage of the electric locomotive is the high percentage of serviceability as compared with the steam locomotive. Yet we cannot consistently compare them from this standpoint, unless provision is made for full utilization of the serviceability of which the modern steam locomotive is capable.

The steam locomotive of today is the product of many years of development with the view to simplicity and reliability with the result that the attainment of efficiency has been more or less sacrificed to that policy. Test locomotives have been built and successfully operated, under favorable conditions, whereby, through the utilization of stationary power plant practices, very high efficiencies have been obtained. However, it is quite doubtful that such types will become common, because the maintenance problem presented will greatly offset all other advantages. Generally speaking, the average thermal efficiency obtaining from steam locomotives is little greater than one-half that obtained by the operation of electric locomotives on power generated at first-class stationary plants, properly operated, and the advancement in this respect is more pronounced in the latter than in the former, because of the more favorable conditions. Restrictions as to space is not a factor, skilled operators may be employed with the view

to obtaining high thermal and mechanical performance, and refinements in equipment may be instituted since the problem of maintenance does not exist in the same degree as in the case of the locomotive. The possibilities for high thermal efficiencies are very much limited in the case of steam locomotives; the opportunities in this respect are in nowise restrained when applied to stationary power plants of considerable size. However, it should be said in passing this point that the possibilities for sustained service with steam locomotives have not yet been attained and it can be said further that were the inauguration of a group of modern engines within a certain section attended with the same engineering skill and given the same support as is done when electrification is set in operation the results obtaining might prove more competitive with the electric power.

The trend of development for stationary power plants in the future undoubtedly will be toward higher initial pressures and temperatures with the object of obtaining higher thermal efficiencies. Such a tendency will have its effect upon electrification projects through a lower unit cost of power. This gain in efficiency will offset a part of the transmission losses or for the same overall efficiency, will permit longer transmission lines and in turn, the concentration of larger quantities of power in the individual plant or plants and of course fewer such plants.

As before mentioned, one of the pronounced advantages from electrification is the peculiar characteristic of this type of equipment which enables it to produce, under favorable surroundings, almost continuous service. Therefore, in laying plans for electrification, full recognition should be given this feature and traffic divisions, for one thing, should be so arranged as to permit long runs, or at least, continuity of runs that will make it possible to gain this advantage. Long mileage of electrified territory is, of course, favorable, but similar results can be accomplished by arranging for prompt return of power at the end of short runs.

The establishment of terminals and shop points has a great deal to do with making electrical operation economical. Repair facilities should be centralized in as few points as possible thus eliminating multiplicity of shop equipment and permitting the concentration of skilled workmen with a minimum capital outlay. Centralization of repairs within certain limits will react on the operation of the equipment to the extent of keeping it on the road, whereas, with a shop too convenient there is always a tendency to hold the locomotive for minor repairs that can readily be handled at the inspection points. Electric locomotives are not subject to many disorders customary with steam power and in consequence repairs are not necessary at intermediate points. The terminal should be merely a dispatching point where but little work is done other than the ordinary running terminal inspection and such minor adjustments as may be found necessary. There is small need for machine tool equipment at terminal points, but it is advisable to have a liberal stock of small parts in order to make replacements when needed. Trains should be dispatched promptly with a view of keeping the power on the road with as little lost time at the terminal as possible.

Consideration must be given to the cycle of wear of the various mechanical parts and electrical equipment within each unit of motive power with a view of repairing or renewing such items as become necessary, thus keeping the locomotive in service for the longest period practicable. In this connection it is recommended that extra parts be kept in stock to the extent of providing major units such as complete running gears, traction motors, track units, etc., thus reducing the total of complete units to a minimum. The same may be said of multiple unit cars as far as maintaining complete major repair units is concerned. The situation is different however, to the extent that ordinarily the equipment reaches a repair terminal on each trip so that the inspection point and repair point in general coincide.

In the routine care of electric locomotives, a difference from steam locomotives is distinctly noticeable. A well designed and operated electric locomotive or multiple unit car, if properly in-

spected and repaired at periodic intervals, may be run between these intervals without any attention, except such inspection as may be necessary to determine that the car or locomotive is in a safe operating condition. The intervals at which the inspection and repair periods must be set can only be determined by operating experience and a careful study of the individual car or locomotive design, having in mind that careful inspection, with minor adjustments, will frequently prevent the necessity for extensive work. It is, therefore, recommended that facilities for testing and inspection of electric locomotives and multiple unit cars at periodic intervals be developed to a high degree, in order to obtain perfection in the operation, and thus reduce detention and intermediate inspection to a minimum.

Fullest utilization cannot be obtained, unless there is full cooperation between mechanical and transportation departments. The successful adoption of electrification requires a full understanding of its peculiar characteristics by all concerned. Educational measures should be inaugurated for this purpose and means for adequate instruction should be instituted sufficiently in advance that those having direct charge of the equipment may be fully acquainted with electrical matters and thus be able to handle the equipment in the best possible manner.

Where practicable, there is a great advantage in using locomotives of the same type for all services within a given district or territory. It will lend greatly to the flexibility of service, reduce the multiplicity of repair parts and operations, and be a large factor in gaining sustained service.

Official Classification Rule Covering Movement of Gas and Electric Cars on Their Own Wheels

During the year a special assignment was given the committee to study and recommend changed wording of Official Classification Rule No. 47. The rule now reads as follows:

*Gasoline or electric motor cars, on their own wheels, gear wheels disconnected: Actual weight less fifty (50) per cent with a minimum net weight charge of 36,000 lb. each..... 5
Actual weight subject to minimum weight of 30,000 lb.*

After due consideration of the features involved, the following wording was unanimously adopted as the proper wording of the rule:

*Gasoline or electric motor cars, on their own wheels:
1st, Self Propelled Cars Other Than Electric Driven: Transmission or driving rods disconnected or transmission positively locked in neutral.
2nd, Electric Motor Cars: Not to be shipped with motors mounted on trucks:
Actual weight less fifty (50) per cent with a minimum net weight charge of 36,000 lb. each..... 5
Actual weight subject to minimum weight of 36,000 lb.*

It is further understood that:

(a) No reference herein applies to electric locomotives or self-propelled cars shipped over rails on their own wheels and under their own power.
(b) Unless transmission or driving rods are disconnected as provided above, an attendant must accompany all such shipments. In any event it is recommended that an attendant accompany all such shipments.

The Rule as rewritten meets with the approval of both the Westinghouse Electric & Manufacturing Company and the General Electric Company.

Inspection Rules

The sub-committee dealing with the subject of inspection rules of which J. V. B. Duer, electrical engineer, Pennsylvania, is chairman, is to continue without instructions until after the American Railway Association completes its conference with A. G. Pack, chief, Bureau of Locomotive Inspection, regarding new Interstate Commerce Commission inspection regulations covering locomotives other than steam operated.

Shop Facilities

As most of the heavier electrification projects have been attempted to handle some certain service condition or capacity, their detail operations have likewise been arranged best to meet the requirements. In consequence, the facilities have somewhat suggested themselves and have grown with the development of the undertaking. At the same time, with the introduction of electric equipment to work with or replace steam equipment, the essential additional features for the dispatching or running repair stations originally laid out for steam are not extensive. In a general way, facilities prepared for steam constitute practically or nearly everything needed for electric and more. At the general repair shops, the situation is somewhat modified and controlled by the

type of equipment. In laying out new shops for either dispatching or general repair work, there may be conditions that might be re-arranged to considerable advantage to improve the order of operations and efficiency.

With the change from steam to electric power, it is in some cases more economical to use multiple unit passenger equipment in place of electric passenger locomotives. When this is the case the passenger car terminal repair shop should receive careful consideration, and will probably require a more radical change than that compared with the steam locomotive dispatching terminal.

Multiple Unit Equipment

There are certain tools necessary for the maintenance of electric multiple unit equipment that must be added to those usually found in steam road passenger car shops. The design of equipment used on multiple unit cars is limited to such extent that the tools and other facilities are practically the same for both direct and alternating apparatus.

The major tools should comprise armature banding lathes, coil winding machines, commutator slotting machines, bake ovens, presses, test apparatus for magnet coils, field windings, separate lathe chucks for boring and fitting up motor and axle bearings and small tools for air compressor and control parts.

Inspection sheds should be provided to handle the required number of cars, and equipped with suitable well lighted inspection pits.

One of the most important facilities required in a well designed back shop is a large crane equipped with special hooks for lifting car bodies off their trucks and placing them on temporary or shop trucks. While most any type of car or locomotive shop would probably be suitable for multiple unit equipment, the output depends entirely on efficient handling of the truck repair work. Therefore, traveling cranes should be provided with sufficient capacity to handle complete trucks. Sufficient floor space should be provided between truck repair tracks for piling of repair material for assembly.

Locomotive Dispatching or Running Repair Stations

Treating on the facilities for the terminal handling of equipment in contra-distinction to repairs in connection with dispatching and running repairs, steam equipment essentially requires provision for coaling, cleaning fires and ash pans, supply water, hot and cold water for boiler washing and filling boilers, steam blower to accelerate firebuilding, suitable inspection pits, and a turntable or wye to handle engines for return trips. Practically none of these are necessary for the handling of electric power, except inspection pits, sand supply, water for rheostats, where used, and provision for fuel oil and water for passenger locomotives using a steam boiler for train heating purpose. Consequently, in changing facilities for the exclusive handling of electric power, they may be materially less than for steam. For the handling of steam equipment, as also applies to electric power, custom practically establishes one of the terminals reached in the course of the daily run or trip as the home or principal dispatching station. At this station, the major part of the running repairs is made, and in the interest of handling the work to advantage and economically, facilities are provided accordingly and in excess of those provided at the other terminals or outlying points. The facilities needed at outlying points for the handling of electric locomotives may be little more than inspection pits, and provision for sand and water supply, depending upon the type of equipment in use.

One idea of the comparison between the inspection and running repairs for steam and that needed for electric locomotives is that the former takes minutes for the inspection and hours to make repairs, while with the electric it takes hours to find the trouble and minutes to make repairs. These figures may be exaggerated, but serve to illustrate the reversal of the conditions.

The actual serviceable time of heavier steam power has been found to be in the neighborhood of 45 per cent as against 85 per cent for electric locomotives. This wide difference in serviceable time is no doubt due in part to the small amount of time required for the work on electric locomotives, in that complete units can be renewed in a comparatively short time. The longer time put on the steam locomotive is accounted for largely by the almost constant attention which must be given to the firebox, flues, stokers, guides, valve gear, reversing mechanism, piston and valve packing and periodic boiler washing and inspection. For electric locomotives inspection pits and means for supplying engines with

sand and oil at outlying points are all that is necessary, except where passenger locomotives are handled means should be provided to supply oil and water.

For the handling of steam locomotives at the principal dispatching stations a turntable or wye is generally necessary to turn the power for the return run, and an engine house of the conventional circular form, with its turntable, well supplies convenience for the routine inspection and repair work. Similarly a turntable has been found valuable in connection with a rectangular engine house for the handling of electric locomotives composed of two or more units, and certain units of other types. By having a turntable or wye time can be saved by withdrawing for repairs but one cab or unit of a locomotive composed of two or more units, and the substitution of another cab to make up a complete locomotive, thus keeping the maximum number of complete locomotives in service, and at the same time handling the repairs on the out of order cabs to the best advantage. In making such exchanges and also to equalize flange wear, it often becomes necessary to turn a cab end for end.

Where electric power has been put in the field replacing steam either partially or completely, the complements of tools needed at the principal dispatching stations will be largely governed by the type of steam and electric locomotives used. Different methods of handling the running gear work at the outlying and principal stations in conjunction with operating conditions, set up problems that must be worked out or adjusted by the railroad to best meet the requirements.

A working pit supplied with a suitable drop pit for wheel and truck work is a convenience that might be considered common to steam as well as electric power, and is as convenient at the general repair shops.

An overhead crane of greater capacity perhaps than used ordinarily at a steam locomotive roundhouse is practically a necessity, for lifting motors, transformers, rheostats, air compressors, and other heavy parts of the electrical machinery from the frames, either through the hatch in the cab roof or after the cab has been removed.

The tool equipment must be distributed between the principal dispatching station and back shop, depending on the distribution of the repair work between the principal dispatching station and back shop as well as on the relation of the shops and whether the principal dispatching terminal is constructed in combination with the back shop or as separate shops located some distance apart.

To handle the work on electric equipment at the dispatching station comparable with the work that would ordinarily be necessary on steam equipment the demands are nevertheless different, and the conditions might be better pictured by considering that in place of the locomotive boiler, steam cylinders, guides, cross-heads and valve gear on the steam locomotives, the electric locomotive carries motors, phase converters, control apparatus, rheostats, switches and relays. In place of the steam locomotive cross head, certain types of electric locomotives have the jack shafts, gears or spring quills through which the power of the motor operates the locomotive. On an electric locomotive having the same general type of steam locomotive frame and wheel arrangement, the driving boxes, shoes and wedges, and brake rigging are practically the same. The side rods on an electric locomotive are practically the same as on the steam locomotives.

For electric locomotives having gear drive and motor armature mounted on the driving wheel axle, the maintenance work on the gear in a general way takes the place of operations corresponding to side rod maintenance. However, the total equipment necessary may be different.

The machine tools required at a steam locomotive dispatching station to maintain such parts would be practically the same for electric, and in the interest of handling the work to advantage, it has been found convenient to have at the principal dispatching stations tools such as a boring mill suitable for driving wheel centers and tires, a lathe of sufficient capacity to swing the largest motor revolving part, a 24-in. lathe, an intermediate size lathe for smaller motor repair work, a radial drill press, a slotter, vertical drill press, horizontal boring mill for bearings and bushings, press for removing and applying motor shafts and shaper, and facilities for repairing switches, relays, instruments, circuit breakers, etc.

For the major repair work which must be handled at shops corresponding to what are generally understood as back shops or shops where general repairs are made, some inexpensive changes

might be made in arrangement of facilities and tools in an existing steam locomotive shop for the same general character of work on electric locomotives to improve the sequence of operations, as they differ somewhat between electric and steam power.

The boiler shop equipment can be eliminated, with the exception of a few tools for the rebuilding and repairing of transformers, rheostats, water and oil tanks and small boilers used on electric locomotives in passenger service.

In most steam locomotive repair shops, overhead cranes have been provided of sufficient capacity to lift a complete locomotive. A crane of sufficient capacity to lift a complete electric locomotive or one cab or unit composing an electric locomotive is desirable, where the design permits, though not always as necessary or as useful as for the handling of a steam locomotive. A crane, however, is quite necessary for the lifting of certain electric parts such as motors, transformers, phase converters, rheostats, and other heavy parts from the frames either through an opening cut in the roof of the cab, or after the cab has been removed. Under the crane should be provided a well lighted working pit, supplied with a suitable drop pit for driving wheels, removing main motors, truck, brake rigging work and similar work on the running gear.

There are many tools in use in the steam locomotive repair shop that might be well utilized in the maintenance of electric equipment, although on account of some of the electrical apparatus being rather special, there may be a demand for a greater number of small tools of special arrangement and design in order to handle small parts of motors, switches, blowers, etc. For instance, a boring mill for driving wheel centers and tire work, a lathe of sufficient size to swing the largest armatures or motors, small as well as intermediate size lathes, a radial drill press, a vertical drill press, a horizontal boring machine, a planer, a shaper and a driving wheel press should be provided. Lathes ordinarily used for piston work can be used for small motor shaft work. The smaller lathes and shapers can be used on a quantity of smaller electrical parts; maintenance of air compressors, dynamos, air brake work and other auxiliary units forming a part of the electric locomotive.

In addition to the equipment usually found in a well equipped locomotive shop, facilities must be added for armature banding, coil winding, press for handling armature shafts, etc. The armature and control repair department should, if possible, be conveniently located adjacent to the machine shop in order to make the best use of the crane service and minimize the re-handling of motors and especially armatures on motors.

As a rule, existing steam locomotive shops, with some slight rearrangement of facilities, are very adaptable for the care of electric locomotives. There are, however, great possibilities for economies in labor and time where new shops are designed for the exclusive care of electric equipment. A definite layout or complement of tools cannot be prescribed, as both depend entirely upon the general design of equipment used.

Electrification Progress

Progress made in the electric traction field during the past year was included as Exhibit No. 4. The new types of motive power units built were commented on and a large table included which lists electric traction installations used in all the principal countries of the world. This table includes a group of pertinent facts which characterize each installation.

Electric Locomotives and Multiple Unit Equipment

A report listed as Exhibit 5 compares the relative advantages of the multiple unit system and electric locomotives for passenger service.

Discussion

Mr. Sillcox: If the membership have any preference as to any of the subjects for next year if they will advise us we can take any four of the nine subjects for next year. (This refers to a list of nine subjects which formed Exhibit 6 of the Report on Electric Rolling Stock and which are not included in the foregoing abstract.—Editor.)

On motion, the report was accepted and the committee continued.

Report of Committee on Tank Cars

Designs of special cars—Recommendations for dome covers, outlets and safety valves

A number of designs of tank cars for special transportation purposes have been approved, the investigation of safety valves, dome covers and bottom outlet valves and connections has been extended and arrangements have been effected with the Interstate Commerce Commission whereunder the experimental application of appliances and appurtenances for tank car use will be made with the approval of the commission.

Approved Designs of Tank Cars

1. ETHYL CHLORIDE CARS.—Application having been made for the approval of a car for the transportation of ethyl chloride, it was determined that, since the general requirements could be satisfied with a car having the characteristics of those covered by the Class IV specifications modified to suit the particular properties of the chemical in question, the proposed cars should be built under a sub-classification of the Class IV specifications.

These cars will have heavier plates and an expansion dome with a capacity equal to four per cent of the combined capacity of the shell and dome. This dome will have a bolted cover. There will also be an additional dome comprising a cast steel nozzle riveted onto the tank proper to which is bolted a standard Class V man-hole cover and dome housing and cover.

The expansion dome is provided with two safety valves. In the filling and discharge dome two 2-in. ammonia angle valves are placed, and from one of these a suction pipe leads down into a suction bowl applied in the bottom of the tank. There is no gravity outlet mechanism.

The design is covered by specifications for Class IV-A cars appearing in the report as Appendix "A."

2. PROPANE CAR.—Designs were submitted for a Class V car for the transportation of propane, offering no departure from other cars of the same class heretofore built except that the tank is 85 in. in diameter and the car and contents are said to be heavier than the average car of similar construction now in service. The builders state that the estimated light weight of this car is 86,500 lb. and that the tank is designed for a load of 40,000 lb., or a total weight on rails of 126,500 lb.

No particular problems were presented except with respect to the braking power as to which the Committee on Brakes and Brake Equipment ruled that since the car was of a special type and the nominal braking power with the car loaded provided ample control in general service, the single cylinder 10-in. brake equipment would be accepted.

3. DINITRO-CHLORO-BENZOL CAR.—This chemical is a non-inflammable product which liquifies at low temperature and possesses no special transportation risk. The properties of the chemical are such as to make it desirable that contact with the hands be avoided. Consequently it is desirable that the construction be such as to minimize the necessity for entering the tank. For this reason a special arrangement of heater pipes has been provided to permit the withdrawal of the pipes from the exterior of the car. This car will be built under the Class III specifications, and will be stenciled "For solids only—Pressure test not required."

4. SULPHUR-DIOXIDE CARS.—These cars comply with the specification requirements for a Class V car and involve no peculiarities of design or construction.

5. ANHYDROUS AMMONIA CARS.—Requirements for the transportation of this chemical are satisfied by a Class V car. The transportation of this chemical is now limited by the I. C. C. regulations to metal cylinders, and special tank cars complying with the A. R. A. specifications and having a maximum capacity of 30,000 lb. This material loaded not to exceed 0.54 lb. for each pound of water capacity. Since there appeared to be no reason for objection to shipments in larger quantities your committee offered no objection to an amendment of the regulations permitting shipments to be made in Class V tank cars.

6. MOLASSES CAR.—The design submitted falls within the requirements for a Class III car and consists substantially of two glass-lined seamless tanks supported on steel cradles. The cradles

are riveted directly to the underframe, and between the tank and the cradles 2-in. cork is provided; also between the heads of the tanks and the ends of the cradles it is proposed to apply a composition material, completely filling up the space. In general, the design follows those which have for some time been in milk transportation service.

7. NARROW GAGE CARS.—In order to satisfy special requirements for restricted service, the committee gave approval for the construction of certain narrow gage tank cars having wooden underframes required for exclusive service on the Denver & Rio Grande. Approval of the construction was with the understanding that these cars were not to be offered in interchange.

Specifications

Amendments and modifications in the specifications for tank cars are recommended as follows:

1. MATERIAL.—Specifications for Class III cars, section 2. Paragraph (b) now reads: "Rivets shall comply with the A. R. A. specifications for Boiler Rivet Steel and Rivets for Passenger and Freight Equipment Cars." This should be revised as follows: "Rivets shall comply with the A. R. A. specifications for Rivet Steel and Rivets for Steam Boilers and Other Pressure Vessels."

Question having been raised as to whether the use of cold driven rivets was permissible, it is recommended that the following sentence be added to paragraph (b) of section 2 of the Class III and IV specifications. "All rivets shall be driven hot."

2. TANK HEADS.—Specifications for Class I and II cars, section 5, paragraph 3 of this section now reads: "Tank cars formerly equipped with head blocks will not be accepted in interchange after January 1, 1926, unless tank heads have been reinforced in accordance with this section." This paragraph is inconsistent with the first and fourth paragraphs of the same section and should be omitted.

3. DOME.—Specifications for Class I and II cars, section 6. Add a new paragraph to paragraph (a) as follows: "When dome cover is renewed it shall be of cast or pressed steel or malleable iron and for screw dome cover, the depth of inside ring shall be not less than 2½ in.; and suitable vents that will be opened automatically by starting the operation of removing the dome cover shall be provided." This contemplates the omission of the note appearing under paragraph (b) for a Class II car.

4. BOTTOM OUTLET VALVE.—Specifications for Class I and II cars, section 7-c, and for Class III cars, section 7-d. Add the following to the second paragraph: "Except for cars used exclusively in the transportation of asphalt or soap products and so stenciled, a valve may be attached to the outlet if it is properly capped." Also revise the note appearing in this section of the specifications to read as follows: "In no case shall the extreme projection of bottom outlet equipment extend to within 16 in. above the top of rail, except that for existing cars having fish-belly sills the extreme projection of the bottom outlet equipment may extend to within 12 in. above the top of the rail."

5. BODY BOLSTERS.—Specifications for Class III, IV and V cars, section 11. Add the following paragraph: "For cars built after January 1, 1926, provision shall be made for jacking under the bolsters."

6. ANCHORAGE.—Specifications for Class II cars, section 13, paragraph (a). Add the following paragraph: "As tank cars receive repairs, wooden shims interposed between the longitudinal anchorage and the underframe shall be removed and all-metal anchorage substituted, and when the construction permits the anchorage shall be riveted to the underframe. After January 1, 1928, no cars having wooden shims interposed between the longitudinal anchorage and the underframe will be accepted in interchange."

Specifications for Class III and IV cars, section 13, paragraph (a). Add following paragraph: "For cars built after January 1, 1926, the longitudinal anchorage shall be riveted to the underframe. As cars built prior to January 1, 1926, receive repairs, when the

construction permits, the anchorage shall be riveted to the under-frame."

7. SAFETY VALVES.—Specifications for Class V cars, section 20. Paragraph (d) now reads: "The design of valve and its arrangement in the dome head shall be submitted for approval." It is recommended that this be modified to read as follows: "The design of valve and its arrangement in the dome head shall be submitted for approval by the Tank Car Committee. Details of approved design will be furnished to interested parties upon application." Add a new paragraph as follows: "Valve must have discharge capacity sufficient to prevent building up of pressure in tank in excess of pressure to which tank is tested."

Repairs to Tanks

One of the important users of tank cars invited the attention of the committee to the desirability of establishing certain fundamental standard maintenance practices for tank car repairs covering particularly the thickness of plates to be applied for patches on tank shells and domes, and the method of application of such patches.

The committee has considered this subject of sufficient importance to warrant an investigation which contemplates a conference with tank car owners, and accordingly has delegated as a sub-committee J. T. St. Clair, A. E. Smith, George McCormick, Thomas Beaghen, Jr., and R. H. Owens.

Safety Valves, Dome Covers

and Bottom Outlet Valves

The work in connection with these subjects is covered by reports of the sub-committees.

Investigations and tests designed to promote improvements in these parts for tank cars have now been in progress for several years, and while a number of appliances have been developed and applied for experimental purposes, with more or less satisfactory results, no definite conclusion as to a better and general type of dome cover, safety valve or outlet valve has yet been reached.

In view of the limited progress thus far made, your committee received approval of the General Committee of a joint investigation to be conducted by the A. R. A. Tank Car Committee, the tank car builders through the Association of Freight Car Manufacturers and the American Petroleum Institute. Negotiations with the two organizations mentioned are now in progress, and it is anticipated that a satisfactory arrangement will be reached whereby the three interests mentioned may jointly undertake the development of designs and the conduct of tests through an independent outside agency and thus not only insure an earlier decision as to the most desirable appliances for tank car application but remove the disadvantages and delays incident to the method now in effect. Your committee has delegated as a sub-committee to co-operate with the other parties at interest, your chairman, W. C. Lindner, chairman of sub-committee on Safety Valves and Dome Covers, and W. E. Cooper, chairman, sub-committee on Bottom Discharge Outlets.

It is hoped that at the next annual convention it may be possible to report definite progress in the solution of problems relating to tank car appliances and appurtenances which are so important in the safe transportation of inflammable liquids.

Service Tests

Your committee has completed an arrangement whereunder service trials of appurtenances and appliances not covered by the specifications may proceed under authority of the Interstate Commerce Commission pursuant to the regulations for the "Transportation of Explosives and Other Dangerous Articles by Freight." This contemplates a limited number of applications of experimental dome covers, outlet valves and other appliances in order that developments in design and construction may be advanced and the perfection of these appliances thereby effected.

Report of Sub-committee on

Dome Covers and Safety Valves

Since the 1924 report four types of dome covers have been installed for test.

We believe that sufficient service trials of the A. R. A. Fundamental bolted type cover have been made and favorable reports of results obtained warrant the incorporation of the design in the specifications, and that it should be followed in all future applications to cars.

Since the 1924 report a test was made of six safety valves submitted by various manufacturers, as follows:

Identification Number.	Designer or Name.
1	A. R. A. Standard
2	Redcliffe
3	Beasley
4	American Car & Foundry Co.
5	American Car & Foundry Co.
6	American Car (Cooper)

It was the opinion of the committee that while valves No. 2, 3 and 6 did not function properly at the test, this was due to mechanical defects in the construction of the valves and not to the principles of design.

It was also the committee's opinion that the operation of the present A. R. A. standard safety valve could be greatly improved by having the springs checked up to see that they have the ends ground and are square to a center axis.

The test, therefore, developed that the present A. R. A. standard safety valve with a monel metal stem and a spider having a monel metal bushing (as represented in valve No. 5) gave the best results, and it was the consensus of opinion that a service test be made of the A. R. A. Standard valve with these features embodied, in addition to making the seat of monel metal.

By consent of E. A. Smith, J. O. Wilson, R. H. Owens and Thomas Beaghen, Jr., the American Car & Foundry Company, through R. H. Davenport, will, therefore, arrange to manufacture 24 of these valves to be applied to tank cars of the following ownership:

Union Tank Car Company	6 valves.
The Texas Company	6 valves.
Cosden & Company	6 valves.
Mexican Petroleum Corporation	6 valves.

Frequent observations are to be made of these valves in service, and at the expiration of a four-month period they are to be removed from the cars, boxed up without making any repairs or adjustments, and shipped to the Union Tank Car Company's plant at Whiting, Ind., where they will be tested out to ascertain their condition.

The committee is indebted to the Sinclair Refining Company for the use of their plant to conduct these tests, and also wishes to thank the various people and concerns who submitted valves for their co-operation in assisting the committee to carry out this work.

In connection with the 24 valves to be manufactured by the American Car & Foundry Company, and applied to cars of the Union Tank Car Company, the Texas Company, Cosden & Company and the Mexican Petroleum Corp., the committee is awaiting the development of these valves by the A. C. & F. Co. who are experimenting with various metals for the valve seats, and when completed a further test will be made at the American Car & Foundry Company's plant at Milton, Pa., before they are applied to cars for service trial, and in addition a number of other valves submitted by various manufacturers and inventors will be tested to determine if they have sufficient merit to warrant a service trial.

Report of Sub-committee on Bottom Discharge Outlets

Your sub-committee on Bottom Discharge Outlets has made a thorough study of all the correspondence and blue prints in its files and submits herewith summary showing the essential facts in regard to each design of valve so far submitted for approval for service trial. The valves indicated by an asterisk are locked on their seats, and from the standpoint of providing security against leakage caused by unseating of the valve by external violence are superior to the valves with which tank cars are now generally equipped.

Inasmuch as at present there are no definite specifications for the complete bottom discharge outlet of tank cars, it is essential that the tank car specifications be amended to definitely authorize the use of valves with which cars are now equipped and to provide for an improved type to be used on all new cars and for replacements on existing cars. Your sub-committee, therefore, submits for consideration the following suggestions:

(1) That Fig. 2 of the present A. R. A. Tank Car Specifications be revised to show a complete assembly of the bottom discharge outlet and its operating mechanism, corresponding to the illustration shown in the I. C. C. Regulations, and including all of the details of dimensions and wording shown on the present Fig. 2:

(2) That Section 7 of the Tank Car Specifications be amended as follows:

7. *Bottom Discharge Outlet.* (a) On tank cars built prior to 1926, if tank is provided with bottom discharge outlet the valve and its operating mechanism must conform in principle to the design in Fig. 2.

(b). Effective January 1, 1926, for new cars and replacements on existing cars, the bottom discharge outlet must conform to the following general requirements designed primarily to prevent accidental unseating of the valve under any condition incident to transportation:

1. A "V" groove must be cut (not cast) in the upper part of the outlet valve casting at a point immediately below the flange, to a depth that will leave the thickness of the casting at the root of the "V" not over $\frac{3}{8}$ in. (See Fig. 2).

Exception.—In the case of steam jacketed outlets, groove may be omitted.

2. The flange on the outlet casting must be of a thickness which will prevent distortion of the valve seat or valve by any change in contour of the shell resulting from expansion of lading, or other usual causes, and which will insure that accidental breakage of the outlet casting will occur at or below the "V" groove.

3. The valve must have no wings or stem projecting below the "V" groove in the outlet casting, unless they are scored or designed to break or bend without unseating valve.

4. The valve must preferably be positively held on its seat by some mechanical means (other than a spring) providing sufficient strength to insure that the expansion of freezing liquid in the outlet casting will break off the outlet cap or the outlet casting without unseating the valve; to prevent displacement of the valve on its seat because of the movement of the car, vibration of the tank, or the effect of movement of liquid contents of the tank; and to prevent side lifting of the valve.

5. The valve and seat must be readily accessible or removable for repairs, including grinding.

6. The valve must not tighten on its seat under the vibratory action of the stem or rod.

7. The valve operating mechanism must have means for compensating for variation in the vertical diameter of the tank produced by expansion, weight of the liquid contents, or other usual causes, and should operate from the interior of the tank, but in the event the rod is carried through the dome, leakage must be prevented by packing in stuffing box and cap nut.

It is also preferable that the design of valve operating mechanism be such that the dome cover cannot be applied until the valve is closed.

8. The lower end of the bottom outlet casting must be tightly closed by means of a screw cap or a bolted cover, and to prevent leakage a suitable gasket must be used when necessary.

Before a bottom discharge outlet embodying these features may properly be applied to tank cars which may be used for the transportation of commodities defined as dangerous by the Interstate Commerce Commission regulations for the transportation of explosives and other dangerous articles, the design of the valve and its mechanism must be submitted to the Tank Car Committee for approval.

(c) To provide for the attachment of standard unloading connections—the bottom of the main portion of the outlet valve casting, or some fixed attachment thereto, shall have external "V" threads $5\frac{1}{4}$ in. in diameter, and a pitch of four threads to the inch. (Fig. 2).

Where a 6-in. bottom outlet valve is used the bottom outlet valve casting shall be designed to have a diameter of 8 in. over threads, and a pitch of four threads to the inch, in addition to connections as above (Fig. 2).

Cars used for the transportation of acids or other corrosive substances, or commodities which are not unloaded through the bottom outlet, if fitted with bottom outlet valve castings to facilitate cleaning of the car, need not have threads as above when designed for the use of a bolted cover.

(d) Same as in present specifications for Class III and IV tank cars as revised at the last meeting of the Tank Car Committee held April 17, 1925, with the words "bolted cover" properly inserted.

The report of the committee on tank cars is signed by A. G. Trumbull (chairman), chief mechanical engineer, Erie Railroad; J. T. St. Clair, engineer of car construction, Atchison, Topeka & Santa Fe; George McCormick, general superintendent motive power, Southern Pacific; W. C. Lindner, chief car inspector, Pennsylvania Railroad System; A. H. Oelkers, chief mechanical engineer, St. Louis-San Francisco; Col. B. W. Dunn, chief inspector, Bureau of Explosives; A. E. Smith, vice-president, Union Tank Car Company; T. H. Beaghen, Jr., Mexican Petroleum Company; R. H. Owens, master car builder, Mid-Continent Petroleum Company.

Discussion

H. L. Shipman (A. T. & S. F.): I would like to recommend two or three features of the report. First, regarding body bolsters; a tank car without body bolsters is difficult to jack on a repair track if you are doing any truck repairs or putting in wheels. If you have the bolsters it is very much easier to make the repairs and it is more economical on the ordinary repair track. I wish to recommend the adoption of that item that the tank cars in the future be built with a body bolster so that it can be readily jacked.

Regarding anchorage, a great many of our tank cars today have a wooden shim between the metal member attached to the tank and the steel underframe. These shims are about $\frac{3}{4}$ in. to 1 in. thick and as time goes on they shrink and the weight of the tank compresses the wood and the bolts become loose.

Then the tank commences to shift on the underframe and hardly any of the bolts are exactly the same length so that they will commence to shear at different stages.

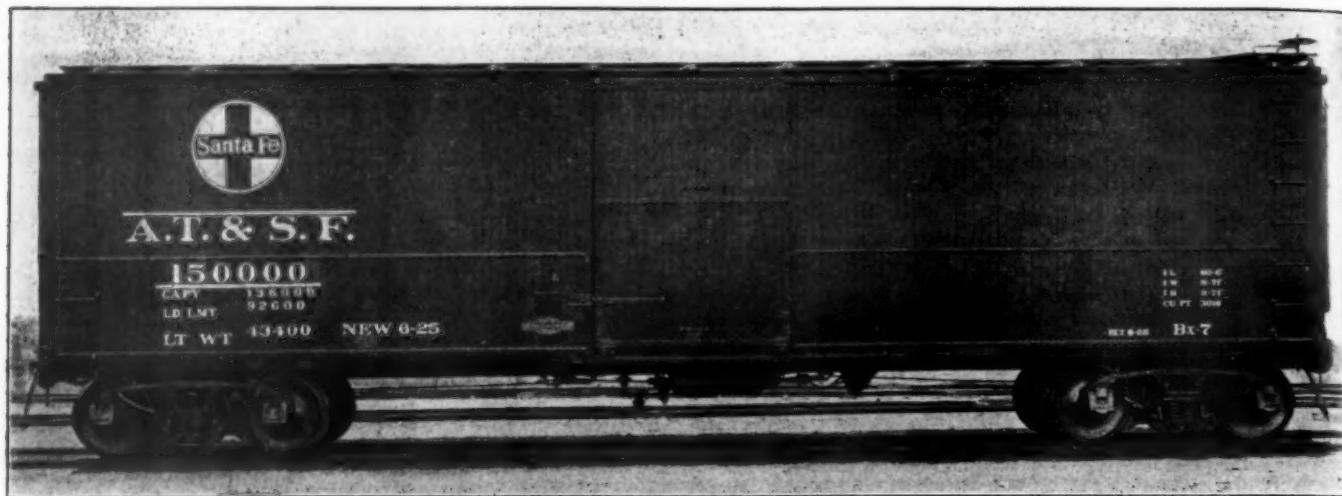
I have inspected a good many tank cars in the last few months and I have found that very common. Also where you have a full metal anchorage without the rivets, that is, a bolted anchorage, you have the same effect. You may ream holes and turn bolts but the bolts don't all fit with the same degree of tightness. We have experienced that in our own shop. We ream all the holes with the same reamer, we turn all the bolts with the same machine with die and the bolts don't fit in the holes exactly all the same. Some will be loose. Some you cannot drive in at all. There is that difficulty in putting in a bolt anchorage. If you have a rivet anchorage where they are driven hot the rivet can be swelled to fill the hole and you have a uniform anchorage throughout the entire shearing area of your rivets. That is a good feature which should be adopted. It will save a great many repairs and perhaps the loss of some oil in the tanks. When the tank shifts the outlet may be knocked off and you lose a tank of oil. We have experienced a few cases like that on our road when the tank has shifted 10 in. to 12 in. and the outlet casting would shear off on the cross ties or on the cover plate and you would lose a car of oil due to these bolts shearing progressively. They may not have received a shock at any one time to shear the anchorage, but a few were sheared at a time until finally they have all sheared.

The committee expects to take up repairs to tank cars next year, I believe. There is one thing I would like to mention, however, and that is in regard to tanks that have had the head block anchorage. I believe there is no limit now set as to when you should put on a shoe patch on a tank head. Perhaps most of the railroads do not have as many tank cars as the Santa Fe. We, at our shop have adopted a standard of $1\frac{1}{2}$ in. When the bottom of the head is caved in so that the surface of the tank is $1\frac{1}{2}$ in. below the original contour of the sheet, we feel that it should be reinforced by a shoe patch. I am offering that as a suggestion. If a tank is deformed more than that it is getting near the breaking strain at the flange, and it has been our experience that they are liable to crack under a shifting load in switching.

On motion the report was accepted and the recommendations of the committee ordered referred to letter ballot.



An Old-Timer in Service on the Southern Railway, Austria



Double Wood Sheathed 40-Ton Box Car, Class 4C-XM2, with Proposed Standard Lettering and Markings.

Committee on Car Construction

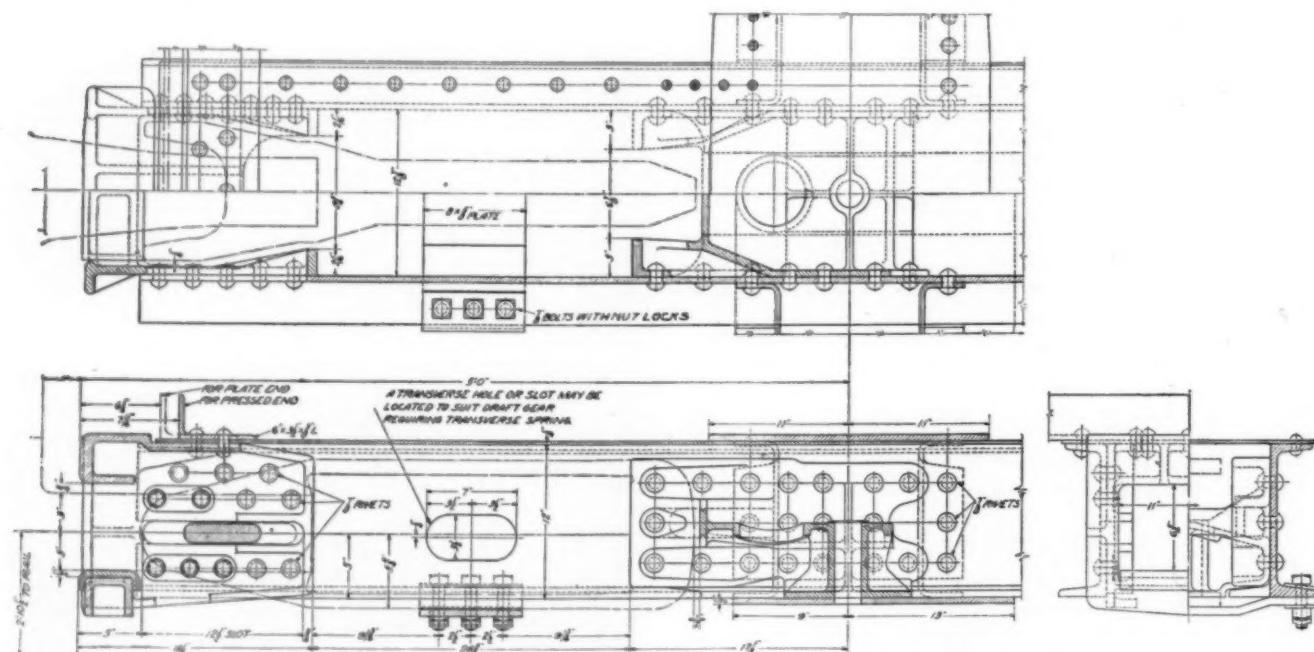
Standard steel frame box cars with wood sheathing and lining—Design and fundamental calculations

In connection with this report, attention is directed to the samples of cars and car equipment, displayed to illustrate features included therein.

The various subcommittees have done excellent work, especially that on Box Cars with Wood Sheathing and Lining, and

not patented, if possible, would be used to illustrate a standard or recommended practice. Any other designs, either shown or implied, would be known as acceptable alternates.

A note will be included with the drawings or specifications for same to govern cars built from the design, reading as follows:



Draft Gear Arrangement with Combined Striking Casting and Draft Lug

that on Fundamental Design Calculations. The last mentioned report could not be condensed without loss of valuable information, for which reason it is included complete, as an appendix to this report.

Standards and Alternates

For the purpose of simplification, and to avoid misunderstandings it was decided that only one design of complete unit or detail,

Anything that is shown on the drawings as alternates, indicates that such alternate is equal to that shown, as standard or recommended practice, in strength, service, and interchangeability, and, therefore, acceptable.

It is to be understood that the committee designs establish fixed conditions, permitting the use of detailed designs standardized by the association, or the substitution of other parts preferred by the individual railroad, singly or in groups, provided these parts, or groups of parts, are the equivalent in strength, service, and safety of, and interchangeable with, the standard part or group of parts replaced.

The subcommittee on Car Designs have adopted rules governing

the size and marking of tracings which will be followed in the future.

Trucks

The general plans show the frames adopted as recommended practice, with minor unimportant modifications, to facilitate foundry work.

The side frames, with boxes cast integral, have been shown as representing recommended practice. The Andrews type and special box type, also cast or built-up types, which will meet design and specification requirements and are interchangeable, are acceptable alternates. The special box types have been previously shown, but new tracings, incorporating the slight modifications for foundry practice, made in the integral box type frames, will be made for the manual.

The bolsters illustrated conform closely to those now in the

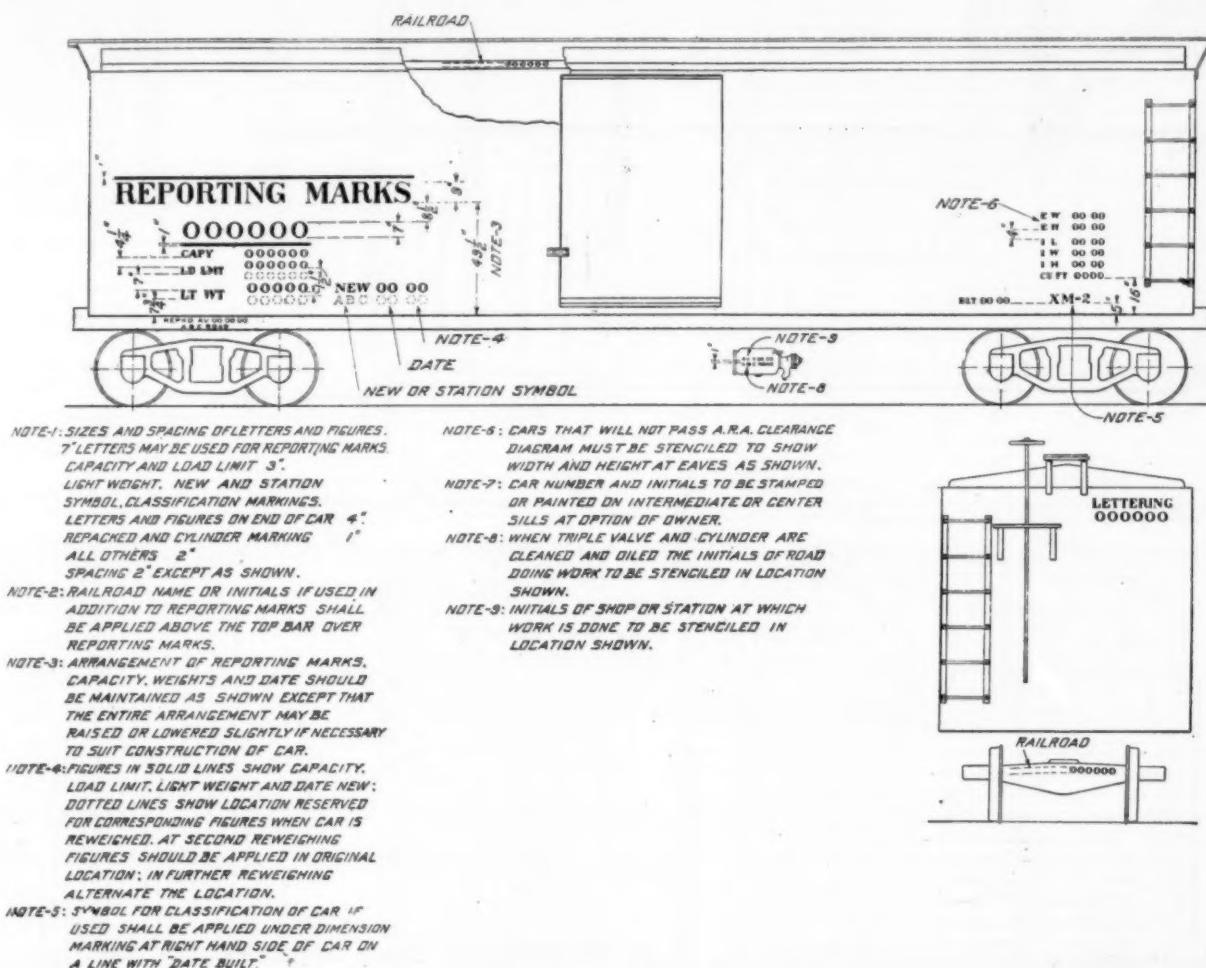
Designs for Standard Cars

Single-Sheathed Cars—These designs, including specific modifications, were adopted as recommended practice. New tracings are being prepared to include the modifications, and will be available later in a supplement to the manual.

Steel-Sheathed Cars with Wood Lining—The committee was instructed to await service results of those already built before resubmitting this to letter ballot. Nothing further has been done with this design.

Steel Frame Cars with Wood Sheathing and Lining—These designs, covering cars of 40 and 50 tons capacity, have been carefully considered by a subcommittee, and are presented for adoption as recommended practice.

These designs include the changes in the original fundamentals, which were adopted by letter ballot vote on the single sheathed



Proposed Standard Lettering and Marking of Box Cars

manual and to the present A. R. A. fundamentals. Other bolsters meeting the design and test requirements are acceptable, if interchangeable.

The bolsters now in the manual do not conform to the standard fundamentals, which makes them obsolete. It is, therefore, recommended that they be withdrawn, and the new bolsters substituted therefor.

The subcommittee on Trucks is investigating what changes are required in the standard arch bar design, to meet the design and specification requirements referred to.

To provide truck frame information, as complete as possible, a subcommittee on Frame Tests is preparing to test A. R. A. and U. S. R. A. frames in three ways: First, on screw-operated static test machines, with both vertical and transverse loads, in conformity with the proposed specifications; second, on the American Steel Foundries Company dynamic test plant, and, third, on the Symington dynamic test plant. It is expected that a summary of these tests, and an analysis thereof, can be presented next year.

car. The fundamentals and general specifications for A. R. A. box cars, as shown in the manual, have been observed throughout.

1—In accord with the modifications adopted by the association for the single sheathed car, the length over striking castings has been reduced from 42 ft. 6 in. to 42 ft. 3 in. This was done in order to avoid having an excessive end ladder clearance when a pressed end is used, and reduces the truck centers from 32 ft. 6 in. to 32 ft. 3 in., with a consequent reduction of $\frac{3}{4}$ in. in the width of each truss panel.

2—As recommended by the subcommittee on Fundamentals of Design, the crossbearers have been relocated at the door posts, instead of at the intermediate posts.

3—A combined striking casting and front draft lug has been designed to replace these two details. This results in a saving of $6\frac{1}{2}$ in. in length of center sills.

4—A new corner construction has been developed for this car, using a $3\frac{1}{2}$ in. by $4\frac{1}{2}$ in. by $3\frac{1}{2}$ in. Z-bar for corner posts. This construction permits of the use of either the A. R. A. standard steel plate end or a pressed end, with the same corner post. The pressed end construction with its constituent parts, i.e., end sheets, end plate, side and end plate construction, end sill and push-pole pocket, taken as a group, is interchangeable with the A. R. A. end plate.

5—In order to avoid cramping the hand brake rod where it passes through

the bolster diaphragms, it was necessary to redesign the body side bearing brace so that the hole for rod could be moved further from center of car. A casting was substituted for the pressing shown for single sheathed car.

6.—The design of the side door has been changed to give more substantial construction.

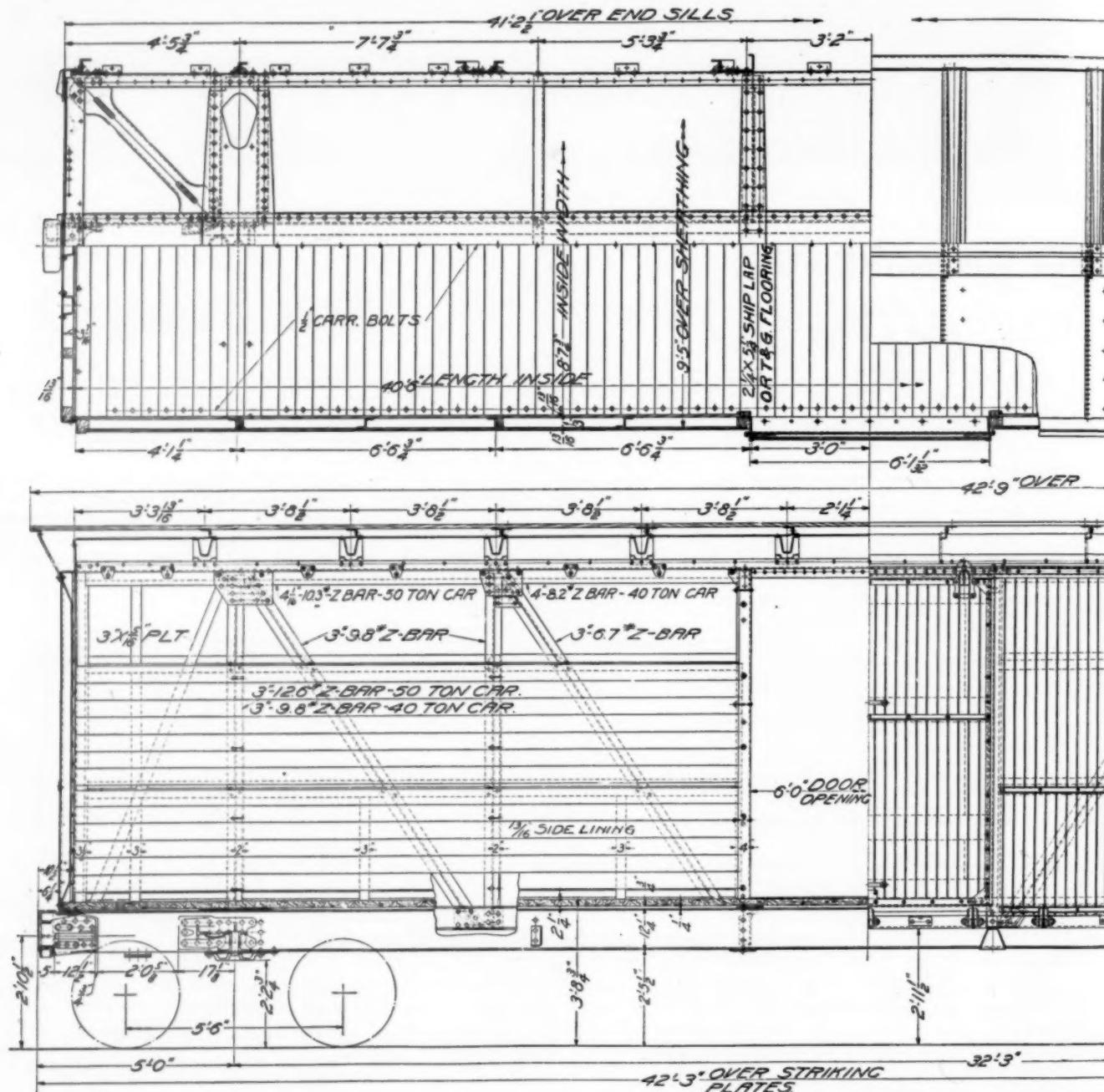
7.—A door track has been added to bring the roller more clearly over the center of gravity of the door. This track is a $1\frac{1}{4}$ in. by $1\frac{1}{4}$ in. by $\frac{1}{2}$ in. Z-bar and serves also as a guide. A bottom supported door can be used without disturbing this top guide, and the bottom guides and the side sill filler supports are so arranged that the track for the bottom supported door can be applied without any additional punching of holes in the side sill.

8.—In order to increase the ease of operation, the door hanger has been redesigned, using a $3\frac{1}{2}$ in. instead of a $2\frac{1}{2}$ in. roller.

construction, and also from the Railway Car Manufacturers' Association.

While it has not been practicable to use a number of details of the single-sheathed car on the double-sheathed cars, new details have been developed which may be used on both designs.

We wish to call attention to the method of making the post and brace connections at the side plate. The outer legs of the Z-bar post and brace are turned toward each other, and a plate is riveted on the inside, the rivets being countersunk on the outside to give a smooth surface for the application of the sheathing. The outer legs of the post and brace are riveted to the gusset plate which is



General Drawing of Proposed Standard A. R. A.

9.—The latitudinal running board supports have been redesigned so that the same support can now be used with either the outside metal roof or the all-steel roof.

10.—Due to the location of crossbearer at the door post, it was necessary to change the brake arrangement. The cylinder and reservoir were moved 3 in. toward the center line of car. Various details were also simplified. The K D type of brake arrangement has not yet been developed.

11.—The brake shaft was lengthened about 1 in. in order to give $5\frac{1}{2}$ in. hand wheel clearance.

Consideration was given to all suggestions and criticisms received from nearly all members of the Committee on Car Con-

flanged at the top, and riveted to the horizontal web of the side plate, instead of to the vertical leg. With this construction, the Howe truss, which is an alternate, may be applied without any interference with the carlines on the outside metal roof. This construction also tends to eliminate the eccentricity in the posts.

The subcommittee will prepare a Safety Appliance drawing for publication in the Manual after the Interstate Commerce Commission representatives have had an opportunity to inspect the sample

cars and criticise the application of safety appliances. Any suggestions the Commission may make can then be incorporated in the drawing.

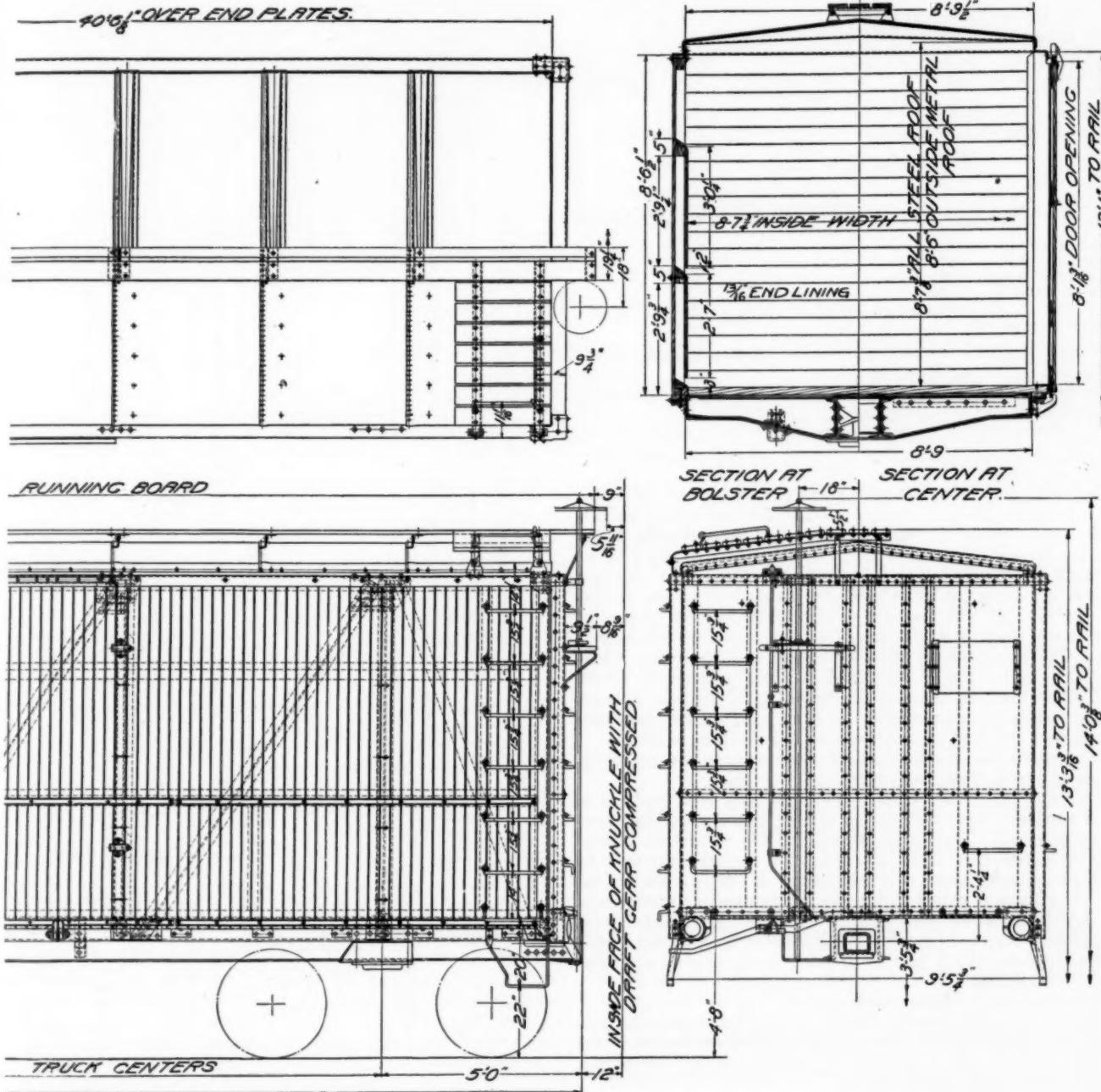
Fundamental Calculations

In the absence of reliable information covering strains or stresses exerted on cars, and methods of calculation to design parts to resist such strain in the car body, it was deemed desirable to appoint a subcommittee of experts in this work to furnish a complete synopsis for our future guidance. This subcommittee, after a large amount of very painstaking and careful work, has produced

This committee will, from time to time, present for approval such design and test requirements, and now submit for adoption as Recommended Practice, Design and Test Requirements for Truck Side Frames and Bolsters, also Coupler Yokes. These have been fully discussed with the representatives of the manufacturers.

It is recommended that, after the adoption of these requirements, the committee on Specifications and Tests be instructed to prepare the necessary detail specifications.

Side Frames and Bolsters—They may be either integral or built-up. The maximum combined unit stress in the design shall



Double Wood Sheathed Box Cars, Classes 4C-XM2 and 4D-XM2

a valuable addition to the available information on car design. Their report is given in an appendix.

Specification Fundamentals

One of the functions of the committee on Car Construction is to indicate fundamentals on which specifications should be prepared. The trucks and other important car parts can best be safeguarded by specific designs and tests predicated on standard fundamentals. The test should prove the correctness of the design.

not exceed 16,000 lb. per sq. in. The basis of design shall be one axle capacity = C.

For each side frame the vertical design load shall be taken as acting on the spring base (or its equivalent, for test) and shall be $1\frac{1}{2}C$. The transverse load shall be taken as acting on the bolster guides—one-half on each guide—on a line located above the normal center line through the two axles, an amount equal to the journal diameter of axle less $1\frac{1}{2}$ in., and shall be $0.4C$.

For each bolster the vertical load shall be taken as acting on

the center line of the bolster, anywhere within 8 in. each side of the center bolster; also anywhere from the center of spring support to a point 23 in. from the center of bolster. The section moduli shall decrease uniformly from the section 8 in. from the center to the section 23 in. from the center of bolster.

The transverse load shall be taken as acting on the neutral axis (or, for test, on a line 5 in. below the center plate bearing face), and shall be applied only at the center of bolster.

For calculation of maximum combined unit stress, the vertical load shall be equal to P , as given in the table, and the transverse load shall be 0.25 P .

The maximum unit stress for vertical or transverse loads, considered separately, shall not exceed 12,500 lb. per sq. in. for vertical load= P , or horizontal load=0.8 P .

The values for P are as follows:

Truck	P
2C	62,000
2D	77,000
2E	96,000
2F	115,000

TEST LOAD REQUIREMENTS

	Side Frame		Bolsters	
	Vertical lb.	Transverse lb.	Vertical lb.	Transverse lb.
Initial load or zero reading.....	5,000	5,000	5,000	5,000
Load at 0.063 in. max. deflection....	2.25C			
Load at 0.075 in. max. deflection....			1.5P	1.00P
Load at 0.094 in. max. deflection....			0.60C	
Load at 0.031 in. max. permanent set.....	4.50C	1.20C	3.0P	2.00P
Minimum breaking load.....	9.00C		6.0P	

Bolsters shall be accepted if the minimum breaking load exceeds 90 per cent of the tabulated amount.

The vertical loads, "P," for bolster, shall be applied separately, at center plate, and at side bearing.

The deflection measuring instrument shall be located midway between supports of specimen, and shall be set at zero, under initial load.

Coupler Yokes—They shall be made of cast, forged, or rolled steel. Each coupler yoke design, intended for use with type "D" coupler and 6 in. by $1\frac{1}{2}$ in. key, shall meet the following design requirements and tests: If made of Grade "A" cast steel, or its equivalent, the tension area shall not be less than 12 sq. in.; and, if made of Grade "B" cast steel, or its equivalent, the tension area shall not be less than $10\frac{1}{2}$ sq. in. The method of support and loading shall be equivalent to service conditions on tangent track. The maximum set shall not exceed 0.031 in. under a load of 325,000 lb., and the breaking load shall not be less than 550,000 lb. The set shall be taken in the length, from the rear follower bearing face to the front coupler key face. At least two specimens of each new design shall be tested on a static testing machine.

All standard fundamental A. R. A. requirements not specifically mentioned herein shall also govern.

Truck Springs—Many serious complaints have been made as to spring troubles. The cause of the trouble is due to spring manufacture practices. These practices will have to be revised, at least to some extent. A large proportion of springs examined by micro-photography show decarbonization, on the surface of the wire, to a marked extent, indicating overheating in manufacture. The low stress in springs, when solid, evidently permitted these detrimental practices to develop. Springs properly made can readily be stressed from 25 per cent to 50 per cent higher than according to present practice.

It is unanimously recommended that:

1.—The tentative spring designs, class L, M, N, O and P, shown on pages 34 and 35, section D, of the manual, shall be substituted for the present standards shown on pages 27-37, in section D.

2.—The tentative specifications for Chrome Molybdenum alloy steel helical springs shall be withdrawn.

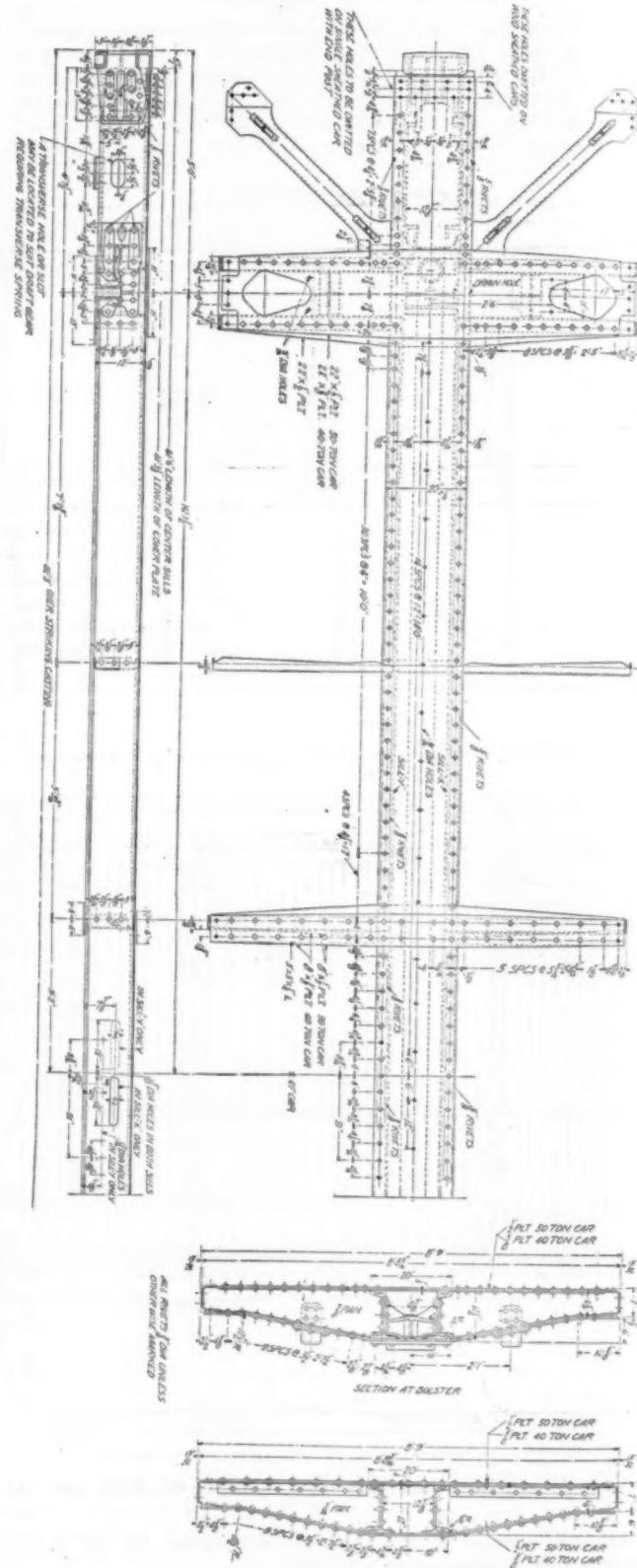
3.—The standard specifications for carbon steel bars for railway springs shall be modified to require free height not to exceed, and the height under specified load, not to be less than the design heights.

4.—The substitution of the present standard 50-ton car springs, as shown on page 32, section D, of the manual for springs of the new standard 40-ton cars, shall be permitted.

The changes involved in the recommended modifications will make no changes in existing trucks, will incur no increase of stress in the springs under static load, will require no different material either in quality or dimensions; but will materially decrease shock effect, thereby benefiting both the springs and truck frames.

It is recommended that, after the adoption of the above, by letter ballot, when it is referred to the Committee on Specifica-

tions and Tests, to prepare the necessary change in the specifications, they should, if possible, include a surface decarbonization limit, and such other photo-micrograph requirements that they deem proper to insure careful heat treatment.



Underframe of Proposed Standard Box Cars

Hatch Covers for Refrigerator Cars—It has been suggested that considerable expense could be avoided if a standard hatch cover be adopted, and all new cars be made to use that standard. A subcommittee made a full investigation of existing cars, and reported

that it would be practical to adopt one standard. They submitted a design of hatch opening and cover advising that this design is adaptable to the greatest number of existing cars, without serious modification to the cars, and will be satisfactory for new equipment. Your committee recommends the adoption of this design as a standard of the association.

Corrections.—Attention was directed to an apparent error in dimensions for the gages for the $4\frac{1}{4}$ in. by 8 in. bearings and wedges. The criticism is justified, and corrections should be made.

We, therefore, recommend the following changes: Section D, page 25, wedge "B," change dimension "D" from $2\frac{11}{32}$ in. to $2\frac{3}{8}$ in., and dimension "N" from $4\frac{1}{16}$ in. to $4\frac{3}{32}$ in. Section "B," page 23, wedge "B," change dimension "D" from $2\frac{11}{32}$ in. to $2\frac{3}{8}$ in., and dimension "N" from $4\frac{1}{16}$ in. to $4\frac{3}{32}$ in.

There is a similar discrepancy in journal bearing gage, section "B," page 22, for class "F" bearing. The $\frac{1}{2}$ in. dimension, at each end, should be changed to $\frac{5}{16}$ in., for the "F" bearing only. We recommend that this be done.

There is a discrepancy in the dimensions of the cap for class

end with vertical posts. The preliminary instructions to the subcommittee include:

1—All tests shall be made on full-size samples, exactly as applied to a car.

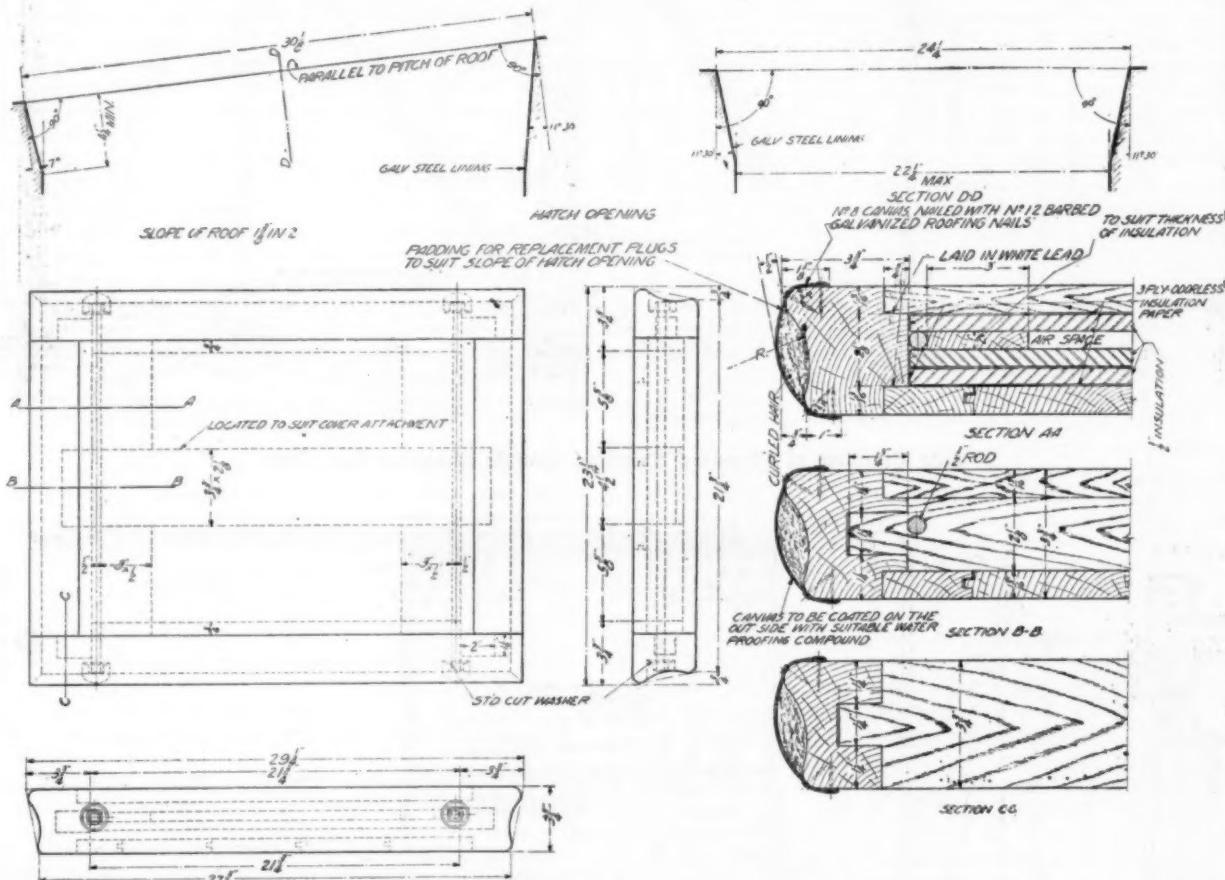
2—Ends to be tested shall be the Murphy corrugated end, and the A. R. A. steel plate end with vertical posts.

3—Ends to be tested shall include the lining and side post construction.

4—The side post construction shall be the same as used on the car, and so reinforced that these posts are not subject to material deflection.

Axles.—It was requested that the non-standard axles having 4 in. by 7 in. and $4\frac{1}{2}$ in. by 8 in. journals be recalculated on the basis of the A. R. A. formulae, to determine whether the nominal capacity can be increased. This calculation showed that the axle with 4 in. by 7 in. journals, under a car with a load limit of 87,000 lb., would produce a stress of 29,520 lb. per sq. in., at the hub section. Therefore, the load limit should not exceed 67,000 lb., to meet the unit stress limit of 22,000 lb. per sq. in. For this axle no change is recommended.

The recalculation for the axle with $4\frac{1}{2}$ in. by 8 in. journals, when the minimum wheel seat diameter is increased from $5\frac{5}{8}$ in.



Proposed Standard Hatch Plug and Hatch Opening for Refrigerator Cars

"H" spring. To make the correction, we recommend that in section "D," page 33, cap for class "H" spring, the dimensions locating the tests be changed from 3 in. to $3\frac{5}{16}$ in., and that the depression for the bolt be made the same as for capacity for class "E" spring, page 35, section "D."

Gages shown on pages 17 to 21, inclusive, of section "B," of the manual, are still standard. They have been practically superseded by gages shown on page 22 and 23, of section "B," which were adopted as Recommended Practice in 1921. We recommend that the latter gages be advanced to standard, and that the old standards on pages 17 to 21, inclusive, be eliminated.

Box Cars (Progress Report).—The claim has been made that box car ends which meet the A. R. A. requirements of section "C," pages 7 and 8, are not as serviceable as they should be; also that comparing ends on the basis of section moduli is not a measure of relative service value, on account of differences in elasticity.

During the coming year a subcommittee will make a thorough investigation of this subject by making a series of tests to destruction of the generally used corrugated ends, and the A. R. A. steel

to $5\frac{3}{4}$ in., will meet the unit stress limitation of 22,000 lb. per sq. in. under a car load limit of 116,000 lb. It is, therefore, recommended that for this axle, the minimum wheel seat diameter be increased to $5\frac{3}{4}$ in., and the load limit be 116,000 lb., for cars equipped with such axles.

Lumber for Cars.—The United States Department of Commerce, by the Central Committee on Lumber Standards, has been active in producing new standards of dimensions and grading of lumber, for the purpose of eliminating waste by simplified practice. We have been requested to make our requirements for cars dovetail with their proposed standards, as far as possible. A careful review of what we need, and what the Central Committee on Lumber proposes to adopt as standard, has led to the appointment of a subcommittee to handle this subject. It was unanimously decided to instruct the subcommittee to ask for:

1—Lumber dressed to $13/16$ in. thickness for lining and sheathing, and, if that cannot be obtained as standard, then request for $\frac{5}{8}$ in. thickness (dressed), as standard.

2—Lumber, dressed on one side, $2\frac{3}{8}$ in. thick, for flooring.

3—Lumber 2 in. nominal rough thickness, manufactured so that the

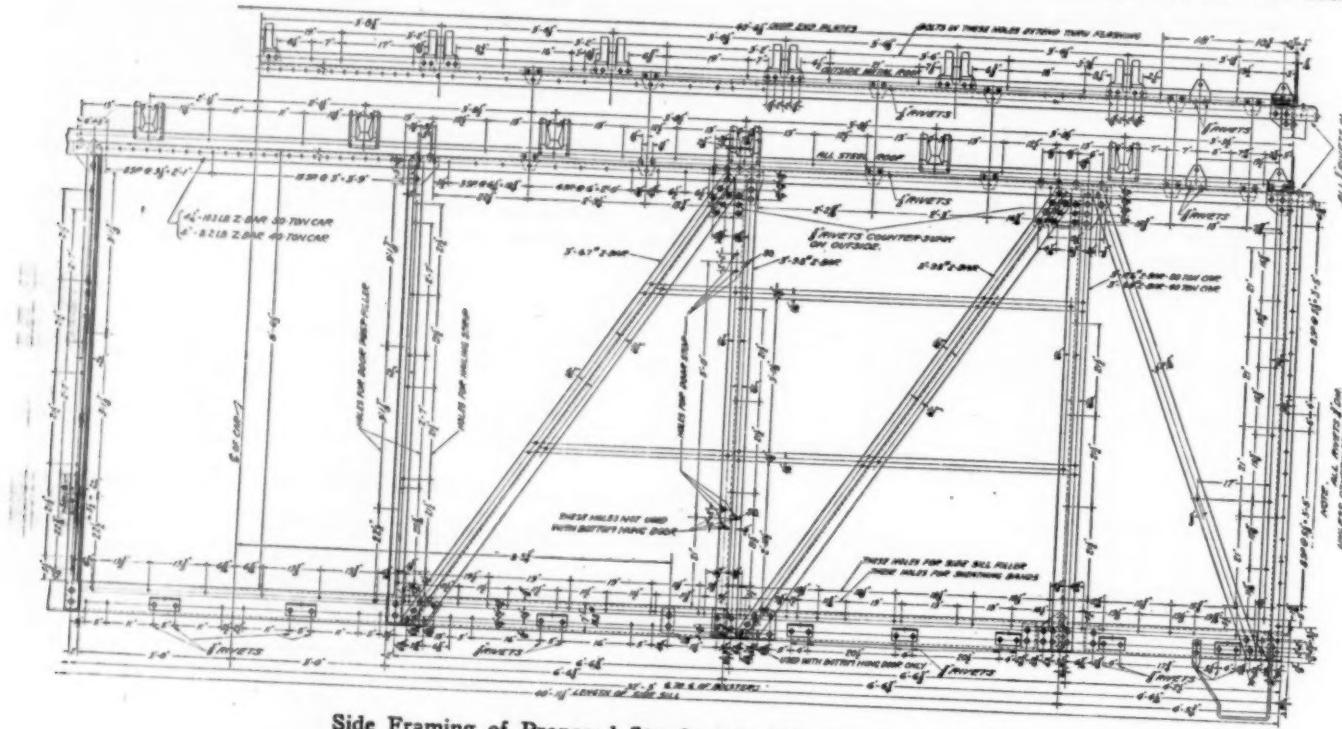
greatest thickness is obtained when dressed on one side; this lumber to be used where $1\frac{1}{4}$ in. is now specified for light flooring.

Moisture content in lumber used for cars is of primary importance, and we have been urged to provide a specification giving as low a percentage of moisture as can reasonably be expected under conditions that must be recognized, and at the same time insures the use of material which will not cause trouble from excessive shrinkage. We recommend as a requirement for lumber

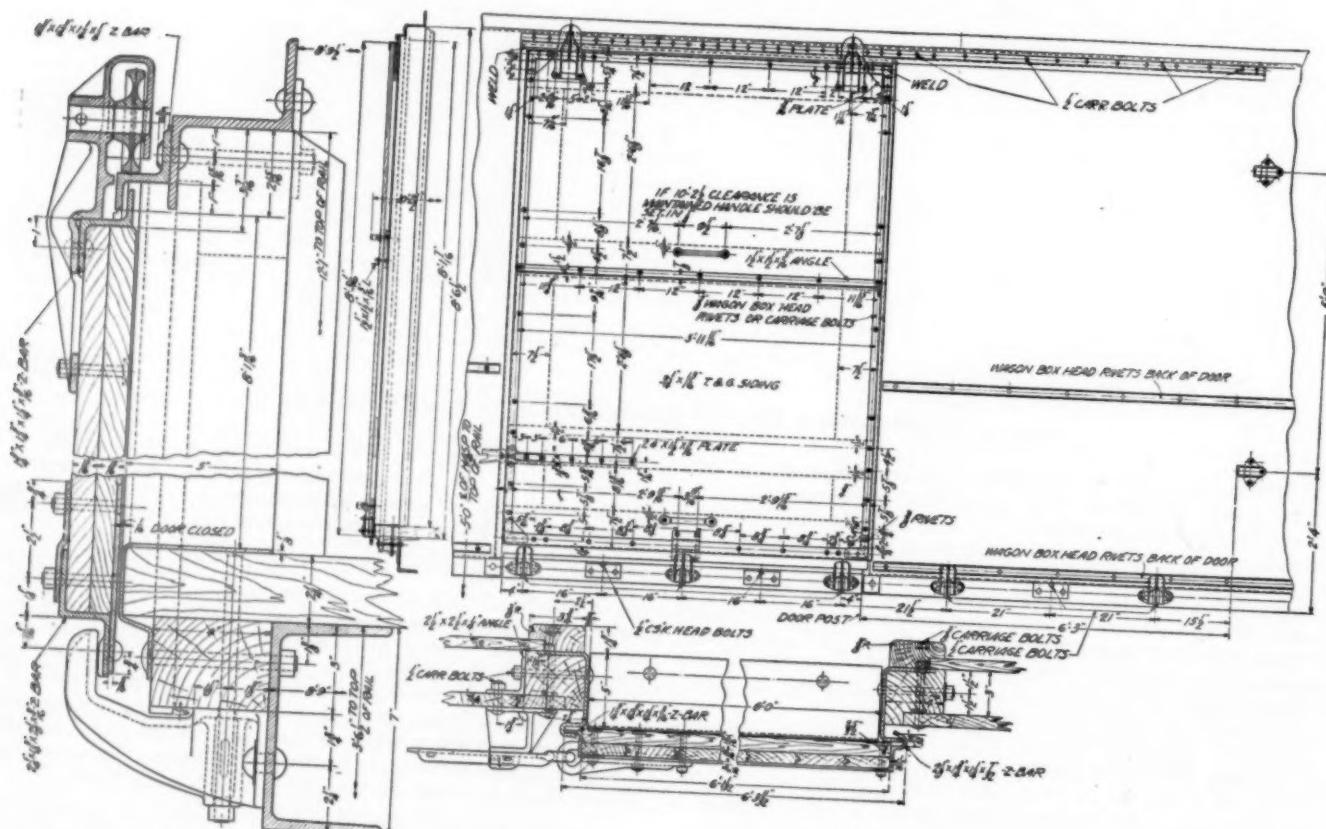
in car construction the following rules for percentages of moisture content in lumber at time of application to car:

DESCRIPTION	NOT TO EXCEED
Up to 1 in. thick.....	10%
Over 1 in. and up to 2 in.....	12%
Over 2 in. and up to 3 in.....	15%
All over 3 in.....	20%

For sheathing of single sheathed cars, regardless of thickness.



Side Framing of Proposed Standard Double Sheathed Box Cars



Construction of Top-Supported Side Door—Bottom-Supported Door Can Be Substituted with Slight Changes

moisture shall not exceed 10 per cent. The moisture remaining in the lumber entering into the car shall be determined by taking as 100 per cent the weight of the test samples, after they have ceased to lose weight.

These recommendations, if carried out, will be a move in the right direction to secure better construction, and while the percentages are more liberal than some roads may wish to specify, they form a basis for trial that should develop whether further modifications are desirable and are so submitted with recommendation for adoption as Recommended Practice by letter ballot.

Malleable Iron Castings (Progress Report)—Requests have been received that we reconsider the elimination of the use of malleable iron for a number of items embodied in proposed standard car designs.

The standard A. R. A. specifications for malleable iron castings are practically obsolete, since metal produced by this process, at present, would permit minimum requirements greater than those specified.

Our rules now permit the substitution of changes in design and material for those given, provided they are equivalent in strength, service, and safety of, and interchangeable with, those replaced.

As soon as an agreement can be reached with the advocates of the more extended use of malleable iron castings, relative to the best specifications that can be formulated to govern the acceptance of such material, it is intended to indicate its value, based on the specifications, relative to steel and iron castings.

Lettering and Marking Cars—In developing designs for new cars it was noted that the present standard lettering and marking of cars as shown in the manual includes triple valves, coupler shank, coupler attachment, brake beams and size of journals, all of which parts are covered by Interchange Rule No. 3 for cars built after November 1, 1920, and it therefore appears unnecessary to include such parts in the marking of cars built after that date.

It was further suggested that the markings for length, width and height could be greatly abbreviated and that height and width at eaves would only be necessary for cars that will not pass the A. R. A. clearance diagram.

In connection with Rule 86, the Executive Committee now has before it a recommendation approved by the Transportation and Mechanical Divisions covering capacity, load limit and light weight marking in place of the former capacity and weight marking. (*See report of General Committee.*)

The committee submits with this report a drawing which embodies all of the preceding suggestions and in addition omits the railroad initials on inside of doors and adds railroad initials on inside of side plate.

The committee recommends the adoption of this proposed marking for:

- (A) All house cars built new hereafter.
- (B) For repainting house cars built new after November 1, 1920.
- (C) Repainting all rebuilt cars which conform in all respects to the requirements of Interchange Rule No. 3 for new cars.

The report is signed by W. F. Kiesel, Jr. (Chairman), mechanical engineer, Pennsylvania System; A. R. Ayers (Vice-chairman), assistant general manager, New York, Chicago & St. Louis; O. S. Jackson, superintendent motive power & machinery, Union Pacific; C. L. Meister, mechanical engineer, Atlantic Coast Line; J. McMullen, superintendent car department, Erie; John Purcell, assistant to Vice-president, Atchison, Topeka & Santa Fe; W. O. Moody, mechanical engineer, Illinois Central; J. A. Pilcher, mechanical engineer, Norfolk & Western; F. H. Hardin, chief engineer motive power and rolling stock, New York Central; C. B. Smith, mechanical engineer, Boston & Maine; S. O. Taylor, master car builder, Missouri Pacific; Ira Everett, general car inspector, Lehigh Valley; W. A. Newman, mechanical engineer, Canadian Pacific; G. S. Goodwin, mechanical engineer, Chicago, Rock Island & Pacific; F. W. Mahl, director of purchases, Southern Pacific; J. J. Tatum, superintendent Car Department, Baltimore & Ohio; L. K. Sillcox, general superintendent motive power, Chicago, Milwaukee & St. Paul.

Discussion

W. F. Kiesel, Jr. (Pa.): In the design for the double sheathed wood sheathed cars only one type of center sills is shown, suitable for vertical yoke. It was agreed two years ago that we would

show center sills suitable for both types of yoke. In making the design for the single sheathed cars we will use the same center sills that are shown for the wood sheathed wood lined car, and also center sills for the horizontal yoke which will be applicable to either one of the other cars.

(*C. E. Chambers took the chair.*)

J. J. Tatum (B. & O.): During the various meetings that the Car Construction Committee has held the question of the strength of the truck frame, adopted as recommended practice, came up, and to be sure that the committee and the association has adopted for recommended practice a truck frame that is as good and as strong as any truck frame now in general use, it was decided to test the cast steel truck side frame made use of by the Railroad Administration with that designed by the Car Construction Committee. We proposed to test that frame under what is known as the Symington testing machine. In order that we get a further contrast, the American Steel Foundries has at St. Louis a similar machine which produces similar tests. There is a slight difference between the two machines, and in order to be sure that we do get the differences in treatment of the two machines on the frames, we will have an equal number of frames tested under both machines. The frames that will be tested will be 40- and 50-ton Railroad Administration frames, and 40- and 50-ton association frames.

We know, too, that the A. R. A. arch bar truck that has been in general use for a number of years has given us a lot of trouble. We believe that this increased load will further aggravate conditions and lead to further failures. To overcome those failures, it was thought that the Truck Committee of the Car Construction Committee might design an arch bar that could be used in repairing the existing trucks so that they would have added to them sufficient strength to overcome the weakness that has already been established, and will take care of the additional load that the new Rule 86 and the new marking will permit in the car. We feel that there are railroads in this country which still prefer to use an arch bar truck. That being true, the association has a responsibility of designing an arch bar truck that will take care of the weakness of the present M. C. B. arch bar truck.

Two of an order of 2,000 cars being built for the B. & O. were selected on which to apply two different arch bar trucks that were developed on the Baltimore & Ohio. One car is equipped with a truck known as the Washburn truck. The other design is similar with the round bottom under the arch so that the stress will not be concentrated at short bends where the old arch bar failed. That truck is built without any nuts, bolts, washers, keys or pins, except for the brake pins and the lower connecting rod and the brake pin used in the live lever rod connected to the bottom brake rod. There is quite a difference between the weight of that truck and the standard M. C. B. arch truck. The M. C. B. arch bar truck with 1 1/4-in by 6-in. arch bars weighs 8,640 lb. without the lateral motion device. The X. L. T. truck weighs without the lateral motion device 8,145 lb., a difference of 495 lb. per truck.

We are not prepared to give the comparative strength of the two trucks under the two different cars, but the M. C. B. arch bar truck, under a static load of 125,000 lb., deflected 1.50 in. and had a permanent set of 1.23 in. The X. L. T. truck under the same load deflected 0.19 in. with a permanent set of 0.10 in.

In addition to the re-design of the arch bar truck, the question was discussed as to the best method of suspending the brake beam to the truck. It is a question whether or not we needed a brake hanger to do this, so we built the truck without a brake hanger. It does all the work that a truck equipped with a brake hanger will do.

Mr. Giles: Have you made any attempt to compare the cost of constructing an arch bar truck of that type or any other type with the cost of the steel side frame truck?

Mr. Tatum: Yes, we have, but at this time I prefer not to mention the figures. However, they are very favorable.

Mr. Bentley: How are the boxes removed when you want to put new ones in?

Mr. Tatum: The rivets were used to assemble the boxes in place in the truck. Now that riveting is generally done all over the country because of the general use of steel cars, we did not think it would be difficult to remove the rivets from the journal box of a truck and apply new ones in the event it was necessary to remove the wheels. However, that is immaterial to this extent, that any railroad that would prefer using the bolted box to the riveted box can do so. On the B. & O. we are trying to eliminate all keys, bolts and nuts wherever we can.

R. L. Kleine (Pa.): Why does the Truck Committee pro-

pose to test the side frames on the Symington testing machine, and on the American Steel Foundries testing machine, instead of one of the standard A. R. A. static machines, or is it the intention to test out these frames under all three machines? There is some question in regard to the Symington machine giving uniform results.

Mr. Tatum: The Symington machine was developed to show more of the actual conditions that take place on a frame when a car is under load on the road than it is possible to show on a static load machine. The side frames will also be tested on a static load machine, so that we will have that along with the other results.

Mr. Trumbull (Erie): In the examination of the truck to which Mr. Tatum has alluded, it is observed that the member which corresponds to the spring plank appears to have a single rivet through the end. I would like to ask if it is contemplated that that provides flexibility as between the spring plank and the side frame, and also how it is proposed to remove a pair of wheels in a truck of that construction.

Mr. Tatum: It was intended to cut the rivets out and move the wheels out from the truck the same as you do now when you remove the wheels from a truck equipped with journal boxes and box bolts, and to arrange your facilities to remove the rivets and apply them in a similar manner. When the two pairs of wheels are to be removed from the same truck, if you like, you can handle it just the same as you would handle an integral box cast steel side frame truck.

Mr. Giles: If I understand the situation, it is proposed to test the cast steel side frame trucks of certain types. We will still be without any information as to the relative strength of this proposed arch bar truck as compared with the cast steel side frame trucks unless an arrangement is made to test the arch bar truck as well. Is it proposed at some future time to provide for that?

Mr. Tatum: We expect that the Car Construction Committee will give us a job to see that those trucks are tested.

Mr. Kiesel: The Car Construction Committee can assure Mr. Giles that now since it has a sub-committee to test truck frames, it will not let it get away, and you will get that information right away.

Mr. Fetters: Is there not more than one point of failure on the arch bar truck? I do not think we should lose sight of the oil box bolts. And then we have shearing.

Mr. Tatum: That is very true, but in this design of truck, if you will notice, we turn up the arch bar ends, and put two rivets between the two rivets that hold the box in place on the arch bar, so the shearing on each end is on four rivets, as against two box bolts—four rivets that can be kept tight, as against two box bolts that can get loose.

(*Mr. Tatum resumed the chair.*)

P. W. Kiefer (N. Y. C.): Referring to the recommended changes in design, our calculations are based on a length of 42 ft. 6 in. The reduction of length to 42 ft. 3 in. does not in any way affect the methods used. It is simply a matter of correcting the figures for that difference, which does not amount to a great deal.

We asked for and received from the Railway Car Manufacturers' Association a number of criticisms that will be taken into consideration.

Dr. W. F. M. Goss: I want to say that the reaction of the Railway Car Manufacturers' Association was entirely favorable to the conclusions of the committee. They also added a few suggestions thinking they might be of use.

Mr. Kiesel: We have made the design on the specifications for side frames and bolsters so that under a combined load the maximum stress will not exceed 16,000 lb. per sq. in. That will give a factor of safety of approximately four. Under direct vertical load we show in the specifications that the factor of safety is about six, so that it will be a factor of safety of six for direct vertical load and a factor of safety of four for combined loads.

Within the last few days my attention was called to the fact that the truss bolsters which have been used extensively on some railroads will not meet these test requirements. At the present time truss bolsters will not quite meet the test requirements. I suggested that possibly some modifications in design should be made to find whether or not they could be made to meet the test limits. If not, and there was a good reason why they should not be subjected to the same specifications, the committee will be glad to get any constructive criticisms, and, if necessary, produce another specification that would take into account the difference in construction of the bolsters.

H. W. Faus (N. Y. C.): Not having any experience with the design of springs recommended in the report, the N. Y. C. with the assistance and co-operation of the C. & O., the Nickel Plate, the N. & W. and the American Steel Foundries made some tests a few weeks ago at Ashtabula, Ohio, in an effort to discover if possible just what could be expected from a spring of this design. We secured a set of the Class O springs and applied them to a 70-ton loaded coal car for a number of tests. While time did not permit our making these tests as exhaustive as we should have liked to do yet we found that the spring here recommended as standard did not make a good showing. I have a detailed report here which I shall not attempt to inflict on you but anyone who cares to examine it is at liberty to do so. Briefly, I may say that these Class O springs took an average permanent set during the test of 5/32 in. and a 3/32 in. lead wire threaded through the coils, while not cut in two was yet badly flattened which indicated that the springs very nearly went solid under normal load. Furthermore, the rock of the car body which was automatically recorded on charts, with this proposed standard spring was worse, with a single exception, than with any one of the other five types of springs tested, a feature which seemed to us to be a serious objection in a spring. Before the association would desire to adopt a new standard freight car spring it should have evidence of at least two things: First, that such a spring can be successfully manufactured, and, second, that it will prove to be a better spring than the present standard.

In view of this meager information which I can offer I would like to suggest that this particular recommendation of the committee be referred back to the Car Construction Committee for further consideration and if it seems advisable an exhaustive investigation of this entire freight car spring question be made before a new standard is adopted.

Mr. Kiesel: We have increased the stress from 80,000 lb. per sq. in. to 100,000 lb. per sq. in., thereby increasing the total possible deflection about 25 per cent and the total capacity about 25 per cent. It was just stated that they put lead wires in between the coils and they were flattened out and nearly cut off. That alone is an indication that we need additional deflection and capacity, and that the springs now go solid too frequently, which gives a shock to the spring. That shock is also detrimental to the truck frame.

I agree that the high center of gravity cars will rock more but the tracks are not as good as they used to be when we did not have such heavy rolling stock, and we therefore need more deflection. It may be that with open top cars in which the body itself is flexible, we can stand letting some of the deflection go into the body of the car. Then it will be advisable to make high center of gravity cars with stiffer frames, that is, less deflection so as to avoid the rock. But the fact that the car rocks less does not mean that the springs are better or the fact that it rocks more does not mean anything but that there is more possible deflection in the spring. So it would seem that we can go ahead. As far as whether we can get the springs is concerned, we know that some of the draft gears have springs in which the stresses run above 100,000 lb. per sq. in. and up as high as 120,000 lb. per sq. in., so that eliminates the question whether we can get them or not. They will cost you more because the manufacturers will have to heat these springs more carefully. They can't do what they do now, take the bar, put it in a furnace, take it out when it is white hot and the steel is almost dripping, coil it on the mandrel, dip it in the quenching fluid and pull it hot and see if it smokes and then put it in the dirt and let it draw itself. That is the way springs are made today. That is the method we have got to eliminate.

Mr. Faus: May I ask whether anybody has any knowledge of any spring of this design ever having been made successfully for railroad car?

Mr. Kiesel: I do not know of any springs that have been made for freight cars but I have had them for passenger cars.

Mr. Faus: We thoroughly agree that there ought to be an improved method of spring manufacture but we hesitate to adopt a spring as a standard of the A. R. A. which never has been successfully applied to a freight car so far as I know.

Mr. Kiefer: The report provides for the substitution of the present standard 50-ton car springs for the new standard 40-ton cars. It is not quite clear to me how that spring can be retained for use on the 40-ton cars inasmuch as it, along with three or four others, is eliminated in the report. Perhaps in one case the

spring is supposed to be eliminated in favor of one of the new standard springs.

Mr. Kiesel: It is eliminated as a 50-ton car spring and is permitted to be put in instead of a 40-ton car spring while they last. The object of putting this in the report is to permit using up springs of this type under a lower capacity car. On any car you can use a non-A. R. A. spring but if it comes in our bailiwick we can put an A. R. A. spring in place of it.

Mr. Appler: I would like to ask the committee if it would not be desirable to increase the strength of the springs rather than to use alloy steel, increasing the fiber stress in the material.

Mr. Kiesel: The alloy steel specifications are withdrawn if this carries. If you increase the diameter of the wire you will naturally decrease the deflection, and the deflection the committee considers is the most important thing in the springs. We are increasing the total deflection from $1\frac{11}{16}$ in. to 2 in. and all that additional deflection increases the amount of deflection in the spring under the maximum load.

Mr. Faus: In our testing of the N. & W. type of spring, which is a heavier, stronger spring, it showed up very much better than this proposed standard that has just been considered.

Mr. Kiesel: May I ask by what gage you consider it better?

Mr. Faus: It showed the minimum car rock.

Mr. Kiesel: Which is not a gage at all. That is a gage of the deflection of the spring and not a gage of the quality of the spring.

Mr. Faust: And it did not come anywhere near going solid at any time, as this spring did.

J. H. Gibboney (N. & W.): The N. & W. has been trying for about six weeks to get some of these springs from one of the best spring manufacturers in this country and it has not succeeded yet. I do not know that it will succeed. They are having extreme difficulty in getting a spring to conform to the old requirements.

Mr. Coddington: We have put in 232,000 of our springs in the last 18 months and up to the present time we have had 20 spring failures. Nineteen of those failures are defective springs due to defects in the spring bar itself. There was one other spring failure, the cause of which is not entirely clear.

Mr. Kiesel: Isn't it a fact that you put those springs under open top cars which have a very flexible body?

Mr. Coddington: Yes, sir.

Mr. Kiesel: And you mean to say you would get the same result under a box car which has an inflexible body?

Mr. Gibboney: We have eliminated derailments.

Mr. Coddington: Those are all under open top cars that we could not keep on the track. Since we put them under the open top cars we are not having to pick them off the right-of-way. We have accomplished that along with the eliminating of the spring breakage.

Mr. Kiesel: Then the open top cars give you the flexibility that your car needs and your springs have not got to compensate for the irregularity of your track?

Mr. Coddington: I am not prepared to discuss the relationship between the spring action and the open top car but I am prepared to say that we had an open top car with the A. R. A. type H spring breaking and failing in thousands. We have eliminated the derailments; we have eliminated the breakage, and we have done it with this spring that we are now using. We don't take the position that that spring is altogether the proper spring, but it more nearly approaches it than anything we have located so far and we have studied the problem very closely. I feel like Mr. Faus that this is a subject that should be given very close study before the association takes the position of recommending something that we don't know anything about at present.

Mr. Appler: Our carbon steel springs that we have been using on open top cars have been going solid and giving very poor service and something should be done in the design of the A. R. A. springs to strengthen them.

Mr. Kiesel: That is why we are recommending increased capacity and increased deflection so as to keep them from going solid.

Mr. Appler: You are not changing the dimension of the spring?

Mr. Kiesel: We are as far as the coils are concerned.

Mr. Appler: You want to get a larger diameter wire to get additional strength.

Mr. Kiesel: If you take a larger diameter wire you reduce the deflection and you need more deflection.

Mr. Appler: With the increasing size of the open top cars

with higher center of gravity, this is a question that should be given very serious consideration.

Mr. Kiesel: I agree with you that open top cars probably require a different type of spring from a car with rigid body, and you may be forced to make a less flexible spring or put a stop on your truck so that it can only rock so far. A high center gravity car on bad track when it rocks very much may get in synchronism with the irregularities in the track and go off on that account, but these springs are principally for cars that have rigid bodies.

Mr. Appler: Our trouble seems to be more with springs going solid. They won't hold up. We have to put 100,000 lb. springs under 80,000 lb. cars to prevent them taking permanent set.

Mr. Kiesel: Because they are improperly made.

Mr. Appler: Tests will have to determine that question but on account of the number of springs taking permanent set, it would seem they could not all be bad.

Mr. Kiefer: It seems to me that the drawings of the brake head, strut and brake beam should not be included in the set of drawings for the car but instead if that brake beam is necessary, it should be referred to the committee on brake equipment. The drawing shows a No. 2 plus beam. I also want to suggest that the lug on the strut be marked as optional instead of as shown.

I would like to direct your attention to the paragraph in the committee's report which reads as follows: "Anything that is shown on the drawings as alternates indicates that such alternate is equal to that shown as standard or recommended practice in strength, service and interchangeability and, therefore, acceptable."

It is our belief that this set of drawings might be made much more beneficial if provisions were made on these drawings to permit a more extensive application and use of universally accepted alternates than the limited number now specifically covered thereon. It would be unreasonable to expect this committee to undertake the making of a sufficient number of drawings to cover all acceptable alternates, presumably permissible for use under the provisions of the paragraph referred to, which have been used extensively and with entire success. We believe there exists no disposition on the part of the members of the Car Construction Committee or of this association to restrict these designs in any way which would result in limiting the benefits to be derived therefrom by American railroads in general.

I move that on each principal drawing showing arrangements of draft attachments, striking castings, carrier irons and details, door arrangements, roofs and steel ends, a note be shown stating that any arrangement of draft attachments, striking castings, etc., may be used as an alternate if conforming to the general dimensions shown and approved A. R. A. specifications for strength requirements; that on the drawing showing the coupler release rigging a note be shown stating that any release rigging may be used as an alternate if conforming to the safety appliance laws and A. R. A. code; that in the drawing showing the side truss arrangement a note be shown stating that the Howe truss may be used as an alternate if conforming to the general dimensions shown; that on the drawings showing the trucks, notes be shown stating that trucks of proper capacity conforming to A. R. A. standard dimensions and strength requirements, may be used as alternates.

The motion was seconded and carried.

Mr. Purcell: The sub-committee made an investigation of existing cars and reported that it would be practicable to adopt one standard of hatch plugs for refrigerator cars. This committee recommends the adoption of this design which has an opening $24\frac{1}{4}$ in. by $30\frac{1}{8}$ in. at the top, $22\frac{1}{4}$ in. at the bottom and 11 deg. 30 min. slope, as standard.

W. O. Moody (I. C.): Referring to the subject of box car ends, one of the manufacturers of steel ends has prepared drawings and is manufacturing at the present time an apparatus for testing full sized steel ends. It is in the nature of a trip hammer. It has an advantage over anything else for the reason it is portable and a blow can be struck at any portion of the steel ends desired, or if it is desired it can be struck in a number of places. The portable feature is good for the reason that it can be placed at any portion of the shop where current is available to operate it, or it can be taken to any other shop as desired. The steel ends are secured to a wooden frame and a method of measurement is used whereby in starting the test at any point where the blow will be struck, a section is made across that end for every inch of the width. After the blow is struck the measurement is taken again and so on to destruction. It is a well known fact that when these ends are distorted the metal is taken up somewhere. Whether it is taken up

vertically or horizontally depends somewhat on the shape of the ends.

We have an arrangement with the same measuring device that was incorporated in this that will allow us to determine exactly to what extent this draw takes place.

Mr. Fetter: The Sub-Committee on Lumber for Cars has heard that there are some objections to the upper limit of 20 per cent moisture in framing, it being claimed that there is too much moisture to enter into framing members of wood structure cars and particularly refrigerator cars.

Dr. Goss: In order that we may secure a better understanding of the problem as it presents itself to the car manufacturers in its relations to your responsibilities I would like to read the following letter from the representatives of the lumber mills, lumber associations and the car-building industry who received information to the effect that the A. R. A. Committee on Car Construction have agreed to the inclusion in their report of a paragraph on moisture content in lumber which is as follows:

"On motion, it was decided to adopt the following moisture requirements for lumber in car construction, to be included in the report of the committee with recommendation for adoption as recommended practice by letter ballot:

Up to 1 inch thick.....	not to exceed 10 per cent
Over 1 inch and up to 2 inches.....	not to exceed 12 per cent
Over 2 inches and up to 3 inches.....	not to exceed 15 per cent
All over 3 inches.....	not to exceed 20 per cent

Siding for single-sheathed cars, regardless of thickness, shall not exceed 10 per cent. The moisture remaining in the lumber entering into the car shall be determined by taking as 100 per cent, the weight of the test samples, after they have ceased to lose weight. These moisture contents to govern for lumber as put into the car."

The approval of these specifications by the A. R. A. Mechanical Division will add some difficulties and increase the responsibilities resting upon the builders of freight cars, but their effect, if subject to certain limitations, will be to improve the practice of freight car builders, and if universally adopted will promote progress; we see no objection to their approval, so far as they apply to siding, roofing, lining and decking.

The art of successfully kiln-drying large sections, such as car sills, and pieces of unusual length, such as ridge pieces, is yet undeveloped, and we assume that it was not the intention of the committee recommending the phraseology of the moisture content specification to include sills, nailing stringers, coal car sides and ends, stock car slats, and other framing pieces of whatever thickness, since there are reasons applicable to each of these details which make either air-drying or kiln-drying to low moisture content impracticable.

Believing that the approval of the specification referred to without the exception we are suggesting would be unfortunate for all interests involved, we suggest that an effort be made to bring the matter formally to the attention of the A. R. A. Committee on Car Construction. The several interests here represented agree to join with the car manufacturers in bringing about such a hearing.

Our conclusion that it will be impracticable, if not impossible, for them to furnish lumber for framing, etc., subject to the moisture content specified, either air or kiln-dried, is based on facts, some of which are as follows:

In kiln-drying, the length is a serious objection. Most kilns are constructed for drying lumber piled crossways of the kiln, the width allotted being about 20 ft. Under these conditions, the only way to dry the longer lengths where the kiln would permit, is to load them on trucks so they will go in lengthways, which sacrifices from 20 per cent to 25 per cent capacity of the kiln. On large sections, the difficulty of handling long lengths would entail additional machinery, and as the material would hardly ever come in sufficient quantity, various sizes would have to be piled on the truck, which would result in bending and twisting the sections in process of drying.

The shorter items, such as framing, come to the car builders rough. The dimensions of these would have to be increased to provide material enough when they are dressed. There is also great difficulty in piling these shorter sections, as many of the framing sizes are very close together, such as $3\frac{1}{4}$ in. by 3 in. and 3 in. by $3\frac{1}{2}$ in. Ofttimes the mills do not cut these close to size, so that the pile when constructed would be uneven and irregular, which would likely cause the pile to fall down in the kiln, obstructing the practice very materially. It would also be impossible to get as large a quantity on the trucks as should be done for

economic practice, and after the kiln-drying had been accomplished, there would appear a great many defects which would cause a heavy degrade, and which would be detrimental to the strength and durability of the lumber when put in the car.

To prepare for kiln-drying this framing would make necessary a separate kiln or kilns for each thickness of lumber; that is, a kiln for 1 in., 2 in., $2\frac{1}{2}$ in., 3 in., etc., to provide for the length of time necessary to kiln-dry these various thicknesses. To attempt to put lumber from 1 in. to 3 in. or 4 in. in thickness in the same kiln would result in destroying the thin lumber, and only case-harden and impair the serviceability of the thicker lumber. Again, it would be detrimental to framing items to have it only partially kiln-dried, even to a moisture of 20 per cent, as the interior of the stick would have sufficient moisture so that when put into use it would eventually result in checking and splitting to the extent that much of the lumber would be practically destroyed after being placed in the cars. This has been tested and proved.

Another consideration is that it is necessary to have a full charge, anywhere from 60,000 ft. to 80,000 ft. of each of the various thicknesses that go into each kiln before the kiln-drying process can start, and as all items of framing are produced simultaneously in small quantities, an attempt to hold the various sizes separately, in order to make a full kiln charge, would result in holding these kilns idle in most cases several weeks.

We consider it impracticable to air-dry sills and other framing members, as these items could not be assembled at the mills or at the car-building plants far enough in advance to permit air-drying to any specific moisture content, when you take into consideration that the average sill and framing member would take anywhere from four to six months, and on the larger sizes even longer, to reduce the moisture content to anywhere near that proposed by the committee.

These statements, so far as air- and kiln-drying are concerned, are based not only upon the experience of the car builders but the fact that in consultation with some of the prominent lumber manufacturers and representatives of the lumber associations, we are informed that so far as the manufacturers are concerned, it would be a physical impossibility for them to supply these framing members to the car builders in quantities required, with any specific moisture content whatsoever.

We suggest that if it is determined that the Committee on Car Construction will grant a hearing upon this subject, we will undertake to extend the notice to all who have expressed an interest in attending.

Those on our side of the problem have been studying this thing and believe that the specification will be constructive. It will quickly accomplish what you wish if for the present it can be limited to these very essential parts of the car, such as the lining, siding, decking and roofing.

J. McMullen (Erie): In my opinion the moisture content question should be referred back to the committee and not put to letter ballot at the present time. The moisture content of siding should be much lower than the moisture content for lining or roofing. I don't feel that 10 per cent is a low enough moisture content for siding. If we are using $1\frac{1}{2}$ -in. lumber on a single sheathed car having a moisture content of 10 per cent the side of the car is going to be open in a very short time. Furthermore when lumber is put in a kiln it may be kiln dried, and if it is piled out in the yard or in a shed for any length of time it will absorb moisture again and it should not be put in the car until it is re-dried.

A. J. Krueger (N. Y. C. & St. L.): The lettering drawing in the committee's report shows letter "L" near the side door to indicate the seal record and should cover a note to explain this, which note should also cover the application of the letter "R" on opposite side of the car. It also appears that Note 6 should be revised to advantage to read as follows:

"Width and height at eaves shall be shown only on cars that will not pass A. R. A. clearance diagram."

Subsequent to the last meeting of the committee a suggestion was received relative to the size of letters and figures in connection with load limit and light weight marking, the suggestion being to use the same size figures for both of these markings.

The use of 4-in. letters and figures for light weight has recently been approved by letter ballot of the A. R. A. and is therefore not subject to change by the Mechanical Division. When the use of 4-in. letters and figures was first advocated there was no load limit marking on the car. The suggestion referred to the use of the

same size of letters and figures for both load limit and light weight marking so as to avoid the use of two different sizes of stencils when reweighing cars. Another suggestion has been made that the words "load limit" and "light weight" should be restenciled when the car is reweighed in order to keep the letters and figures on the same line.

Your attention is called to the great reduction in the amount of lettering and stenciling under the proposed plan, compared with the markings that are now generally being applied to cars. This involves not only the appearance of the car, which is important, but also a great amount of expense which appears to be unnecessary. The abbreviations for the dimensions of cars having been reduced to extreme simplicity, the committee feeling that these abbreviations would be fully understood within a very short time after adoption.

Considerable effort was made in arranging the marking on the left side of the door to keep the reporting marks and car number as low as possible, and if it is necessary to deviate from the drawing to conform to certain car designs, such as single sheathed cars, this point should not be lost sight of.

For repainting cars built prior to November 1, 1920, the revised drawing can be used to good advantage by adding whatever special stenciling, such as brake beams, couplers, etc., may be necessary to protect the car owner. If such markings covering brake beams, couplers, etc., are stenciled on the end of the car which is the practice of a number of lines, this would permit the side of the car to be lettered in accordance with the proposed drawing.

Mr. Kleine: I do not understand that the reporting marks are mandatory as a standard. The reporting marks are a recommended practice of the Car Service Division and naturally our cut is taken from them. I would like to ask the chairman of the committee whether it is intended to make the reporting marks mandatory, by the wording of Note 2.

Chairman Tatum: As I understand it, this marking is not mandatory. The only mandatory rules are those covered by the interchange rules.

Mr. Kleine: The present note reads that the railroad name or initials, if used, in addition to reporting marks shall be applied above the top bar over reporting marks. In other words, that does not permit legends or the railroad name to be used as the reporting marks, and I suggest that Note 2 of the drawing be clarified to show that this may be done.

The Chairman: You see no objection to that, do you, Mr. Fettters?

Mr. Fettters: No.

J. T. St. Clair (A. T. & S. F.): The 40-ton car on exhibition has been stenciled to follow this suggested arrangement. You may have noted also between the letters I. L., I. N. and I. H. on the right hand side we placed a dash, and also the foot and inch marks have been placed on the car. That was done as a suggestion for your consideration.

G. E. Smart (C. N.): It seems that there is some misunderstanding as to what is the meaning of the word "capacity". I notice that on the 50-ton car on exhibition, the owner is using the axle capacity of 169,000 lb. My understanding of this word "capacity", is that it represents a nominal capacity that was used heretofore.

For instance, on the 5½-in. by 10-in. axle, the proper stencil to use is 100,000 lb.

Mr. Fettters: The car is not stenciled strictly in accordance with A. R. A. requirements, but does bear the following capacity markings: Capacity, nominal, 100,000 lb.; load limit on the rail, 169,000 lb. The load limit on the rail is not capacity. The light weight is the next item, followed by the maximum loading capacity, which is the net subtraction of the last two lines. In other words, this marking is so arranged that it is not necessary to put down those two figures on a piece of paper and subtract them to find out what you are going to put in the car. It was put on knowing that it was not the A. R. A. recommended marking, but for consideration and study. Our traffic people have felt that it would perhaps be confusing if that subtraction were not made and carried out on the car so as to give the exact maximum loading permitted in the car and stenciled on the car.

H. H. Harvey (C. B. & Q.): It seems to me it would be a great mistake to put the axle carrying capacity, and the total weight on rail, on the car. We have a great deal of difficulty in applying the stencil on single sheathed cars at the present time. If you use another line it adds to the difficulty. I do not believe that the shipper is interested in that and the car man who does the stenciling certainly can soon learn the total load limit on the rail.

Mr. Kleine: The load limit markings on the car represent all that are necessary. The total of the load limit and light weight would equal the axle capacity. The General Committee decided to add a note to the Interchange Rules stating that the sum of the load limit and light weight should always equal the axle capacity.

By action of the meeting the recommendations of the committee on the following subjects were submitted to letter ballot:

Substitution in the Manual of bolsters shown in the report.

Proposed standard double sheathed box car.

Design and test requirements of truck side frames and bolsters, and coupler yokes.

Hatch covers for refrigerator cars.

Axle.

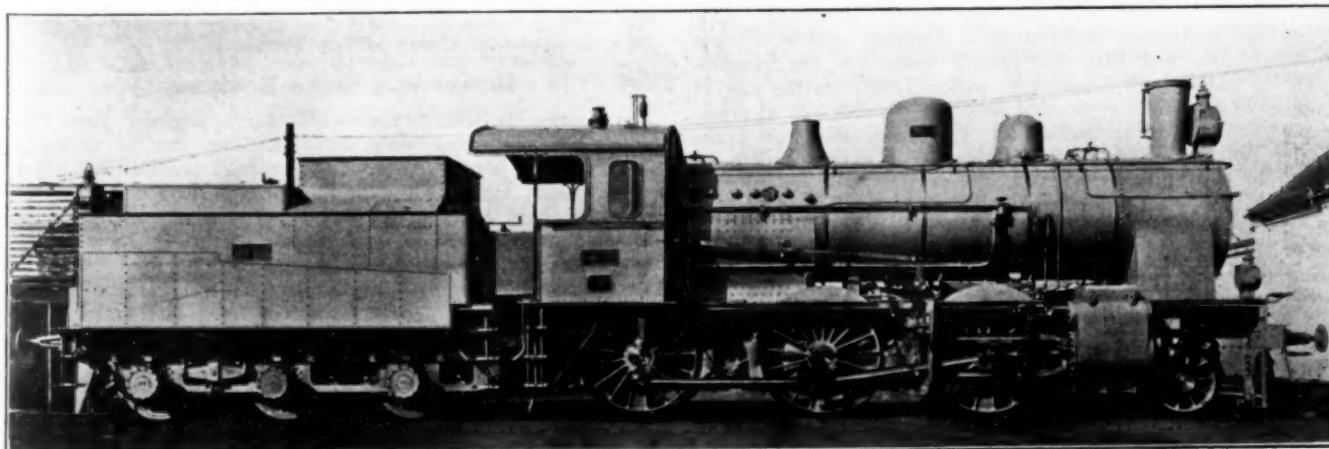
Lettering and marking of cars (with suggested change in Note 2 of the drawing).

The following subjects were referred back to the committee for further investigation and report:

Tentative spring designs.

Moisture content of lumber.

BULLETIN NO 9 has been issued by the Railway & Locomotive Historical Society, 6 Orkney Road, Brookline, Mass. The principal article is a 12-page sketch of the history of the Portland Company, Portland, Maine, as a former prominent builder of locomotives. This company, still flourishing in other lines, has built no locomotives since 1907. In 1852 it built the first locomotives for the Panama Railroad, and in 1882-83 built 100 for the Northern Pacific. Another bit of history contained in this pamphlet says that the New York & Erie, in 1856, employed 500 men, owned 203 locomotives and had a telegraph with 60 telegraph agents "so that any occurrence on the road could be instantly made known to the officers."



On the Roumanian State Railways

Report on Brakes and Brake Equipment

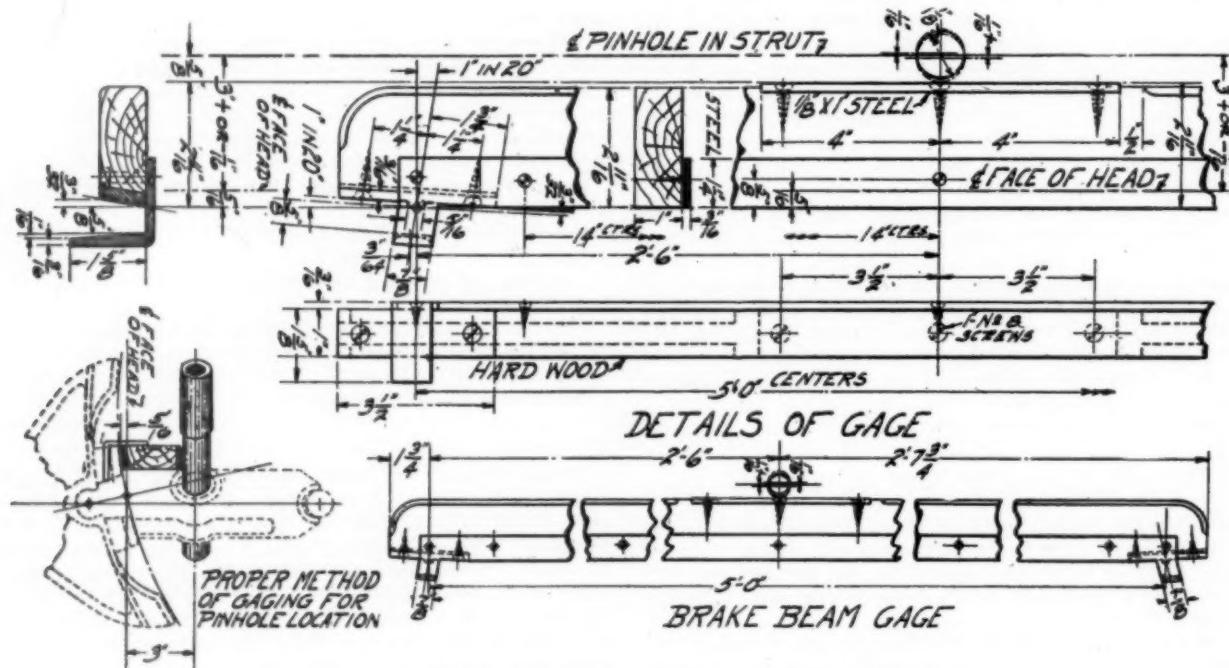
Brake Beam Supports Considered—Recommends Changes in Beam, Head and Shoe Gages

In last years report your committee gave some consideration to the question of brake beam safety supports, and have in the interim inspected a large number of cars equipped with such devices. This inspection developed the fact that a large variety of supports are being applied, but with few exceptions they require constant maintenance to maintain them in condition to serve the purpose for which they were applied. Those types which appear most dependable and free from necessity for frequent repair, in most cases, present some difficulty to the application and removal of brake beams without dismantling the truck. Your committee has not up to the present time de-

slack adjusters, triple valves, control valves and high speed reducing valves must have been cleaned, oiled and tested within twelve months, and date of last cleaning and oiling stenciled with white paint in a suitable location for visual inspection. Dirt collectors and strainers must be cleaned at time of cleaning triple valves or control valves.

(b) Piston travel less than 7 in. or more than 9 in. with maximum service brake application, must be adjusted to nominally 8 in.

Classification of Rebuilt Brake Beams in order that second hand beams might be classed and charged for at the same price of new beams has been considered, however, you will appreciate that repaired beams are placed in exactly the same service as new beams, and may be expected to become subject to necessity



Detail Drawing of Brake Beam Gage

veloped anything satisfactory along the lines of an efficient brake beam safety support, but are continuing their efforts.

We have been requested to specify a price for brake cylinder packing other than the price now specified in Interchange Rule 101 on the basis that material of a superior quality is now available. We feel that the present price for the common brands of leather and composition packings now on the market is ample, in view of the fact that they may be procured at prices specified. We are arranging for an investigation of brake cylinder packings to determine if there is any justification for changes in Rule 101.

During 1920 your committee conducted some tests to determine if possible a standard capacity of retaining valve for freight equipment cars. Owing to the business depression following this work was not concluded. The committee has been instructed to resume investigation of this subject and have made some preliminary tests.

During the past year your committee has completed the revision of Rules and Regulations for Testing, Inspection and Maintenance of Power Brakes. In this connection we would call attention to rule 15 (a) and (b) in the Passenger Code of Interchange Rules. This rule should be modified as follows:

Rule 15 (a) Brakes must be in perfect working order. Brake cylinders,

for further repair in much less time than the latter; and the charges and credits for repaired beams we think, are ample to reimburse the railroads for such repairs. We are under the impression it would be a mistake to establish for repaired beams the same status as applies to new beams.

Brakes and Brake Equipment

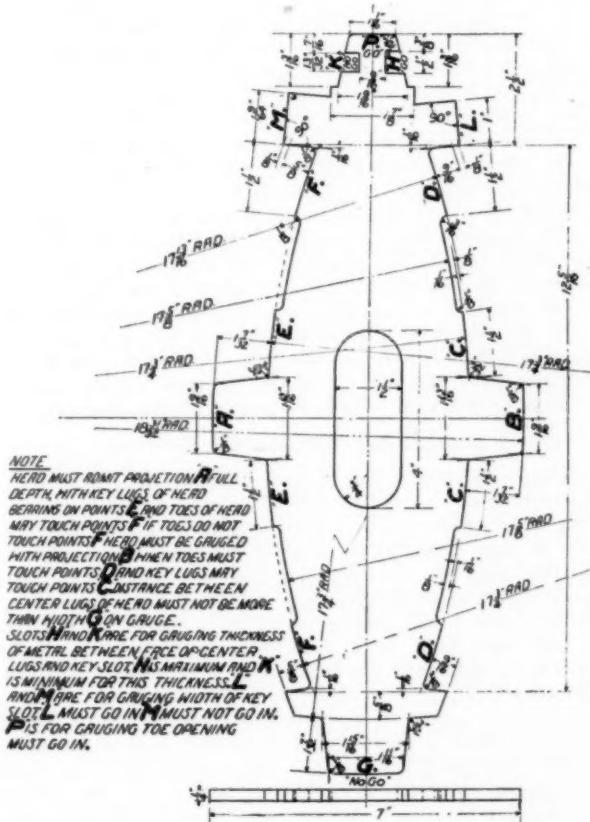
In connection with brake beam safety supports your committee has considered brake beam troubles due to failure of hangers. The present A. R. A. brake head provides for a 1-in. brake hanger, and recently the drawings were modified to eliminate the sharp edges in the hanger groove to prevent wearing hangers, causing them to break in the corners. The committee will co-operate through a sub-committee with the Arbitration Committee who now have this subject under consideration, with a view of providing details for brake beam and brake hanger maintenance.

Suggestions for changes in graduating springs for freight triple valves has been made and we wish to advise that this matter is now in the hands of the Director of Research A. R. A. who contemplates tests of such devices. Suitable action will be taken in accordance with the information disclosed by such tests.

Recommendations

The 1921 report of the committee on Brake Shoe and Brake Beam Equipment contained a drawing of the A. R. A. brake beam gage, which showed several changes over the gage adopted in 1920 and which is still the A. R. A. standard. The present standard adapted itself to beams made to hang 14 11/16-in. on a 33-in. wheel when the strut was parallel to top of rail, however, the position of the present standard A. R. A. brake beam is 13 in. from center of brake head to top of rail and it will be necessary to change the dimension 2 15/32 in. from front to back of gage to 2 11/16 in., and provide a taper of 3/32 in. to that part of the gage which comes in contact with the face of the upper head lug. These changes were outlined in the 1921 report. We would, therefore, at this time recommend the changes in brake beam gage drawing shown in the A. R. A. Manual, division (B), page 7, to conform to that shown in the accompanying drawing.

We would also recommend changing the present A. R. A. brake head gage drawing shown on page 8, A. R. A. Manual, division (B), to conform to that shown below, at this gage is uni-



Brake Head Gage

versally used by brake beam manufacturers because it has the advantage of more accurately gaging the entire face of the brake head, and there are no changes of dimensions which will affect the present A. R. A. standard.

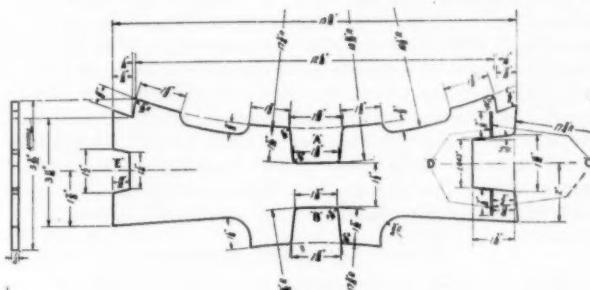
An apparent weakness in the present A. R. A. brake shoe gage has been brought to our attention and we would recommend a change in the present drawing shown on page 9, A. R. A. Manual, division (B), in order to increase the dimension $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. and strengthen the gage at the center as shown in the drawing.

Attention has been directed to the practice of stretching springs in the spring type retaining valve, presumably for the purpose of overcoming leakage of valve seats. This trouble was more prolific when the spring type retainer first came into general use than is the case at the present time. The committee recommends that each road call attention of their repair men to the practice of stretching these springs and request that such practice be discontinued. Stretching the springs increases the

brake cylinder pressure retained, reduces the flexibility of control and may contribute to wheel and brake shoes troubles.

Your committee recommends for letter ballot the following:

The committee's attention has been called to cases where there is an appreciable difference in the actual and nominal diameter of brake cylinders which influences the life and efficiency of brake cylinder packing on account of cylinders being considerably larger than the nominal diameter. Your committee would, therefore, recommend for adoption as recommended practice, that the



Brake Shoe Gage

actual diameter of brake cylinders for freight cars should not exceed the nominal diameter by more than $\frac{1}{16}$ inch.

Advancing to standard the present recommended practice brake beam having central head hanging only.

This report is signed by G. H. Wood (chairman), supervisor of air brakes, Atchison, Topeka & Santa Fe; T. L. Burton, air brake engineer, New York Central; B. P. Flory, superintendent motive power, New York, Ontario & Western; J. M. Henry, general superintendent motive power, eastern region, Pennsylvania System; W. H. Clegg, chief inspector air brakes and car heating equipment, Canadian National Railways; Mark Purcell, general air brake inspector, Northern Pacific; R. B. Rasbridge, superintendent car department, Reading Company; G. E. Terwilliger, supervisor of auxiliary equipment, New York, New Haven & Hartford.

Discussion

G. H. Wood (A. T. & S. F.): We inspected a large number of cars equipped with different types of brake beam safety supports and we found them in all stages of disrepair. The support would be missing entirely on one truck, or on one side of one truck; in some cases they were missing on both trucks. It was surprising the condition of the brake beam safety supports which are being generally supplied. In nearly every case where the support is not riveted rigidly to the truck frame, it can't be depended on. They require too infrequent maintenance to keep them in condition, and the inspectors are not giving them sufficient attention.

The committee was simply at a loss as to an efficient brake beam safety support, and for that reason wants to get sufficient information so that we can develop either a specification or specify some particular type. Two angle irons riveted to the truck frame is the simplest, cheapest, and to our minds, the most dependable that we can get. It may present some difficulties that will justify something else. That is a thing we want to look into before we specify anything in particular.

We believe that it will be possible for us to determine one particular type of retaining valve as a standard to substitute for some 12 or 13 types that are now used in freight cars.

Mr. Purcell: The Safety Appliance Committee together with the Brake Committee have had several conferences with the Bureau of Safety on the maintenance of air brake and air signal equipment on locomotives and cars.

There have been some changes in the present rules for testing brakes in road work and also the manner of testing retainer valves and a few other changes. These changes have been agreed to by Mr. Borland, director, Bureau of Safety, Interstate Commerce Commission, and the General Committee of the Mechanical Division, but as far as I know they have not received the approval of the Interstate Commerce Commission. I hope that

they will, and that every railroad officer will see that they are carried out to the letter.

W. E. Dunham (C. & N. W.): The remarks of the committee on the matter of the satisfactory type of safety strap are in full accord with our experience, but we go even a little farther than they do. We have not found a safety strap that you rivet on that will stay on, and we do not know what to use.

We are trying a device at this time which has been developed on one of our neighbor roads that is held to the framework of the truck, either the angle or the channel irons and plank with a spring arrangement, and we believe we have now got something that is better than anything we have ever seen.

Something should be done to improve the air brake cylinder packing situation. There are packings on the market which give us so much better performance than the packing provided for at the price given in the rules that I think we ought to do something about it. We have seriously considered using a higher priced packing, but we can't quite justify putting that packing into everybody's cars and getting the other packing back in our cars. I think it is important enough to go after very strongly.

Brake Cylinder Packing

Chairman Tatum: We would like to have cylinder packing discussed thoroughly. It is a live subject and we should know more about it.

T. L. Burton (N. Y. C.): I believe that we are near the point when we can be relieved materially from the standpoint of brake cylinder leakage. The New York Central for one, and I know of others in a similar position, have been operating not one but more than one type of packing in some very important service out of New York City for practically four years. That packing is tested periodically with a gage to determine leakage, and the only way we can find the leakage is to make the test period for at least five minutes and divide the drop in pressure by the time involved. And in testing it that way, at the end of the four-year period, the leakage at the last report averaged .54 lb. per minute, with the maximum of one pound per minute. That was not with one set of packing, but with, at least three. We had a similar experience on suburban cars operating out of Chicago.

On the question raised by the member who spoke of a number of packings that were in service: Your committee is aware of that fact and at its last meeting appointed a sub-committee to go into every phase of that subject with a view of having you recognize only the packing whose merits have been established.

A. H. Fettters (U. P.): Piston travel is from seven to nine inches with a normal adjustment of eight. I would like to hear some discussion on the amount of piston travel because it seems to me, personally, that that is a little strong for an average over the country. In going over these A. R. A. rules they give a little better than that. We have given from six inches to eight inches with a normal adjustment of seven inches.

C. F. Giles (L. & N.): I had occasion recently to make a very thorough investigation on our own line as to the relative merits of the Wabco packing leather as compared with the leather that we formerly used for the retaining ring. When we adopted the Wabco packing leather about 1920 we were influenced largely by the fact that we could do away with the retaining ring and therefore very materially reduce the first cost of the packing leather. About three or four months ago one of our master mechanics set up a claim that he was renewing a great many more of the Wabco cups than he formerly had to renew of the leather cups. I doubted the statement and I made a thorough investigation of the number of Wabco cups purchased during the year 1924 as compared with the last year that we used the leather with the retaining ring. I found it was true that we had purchased a great many of the Wabco packing cups, but in our efforts to improve the general condition of our air brakes during the last two years we necessarily used a great many more cups than we did of leather cups during 1920.

I carried the investigation a little further. I had the scrap pile thoroughly inspected and I found that they had removed and cast aside a great many of the Wabco cups that were in perfectly good condition. I had some of them sent up to the headquarters and inspected them myself, sent them out to our shop and reapplied them and they stood the leakage test perfectly. The trouble is due to some other cause and not to the defective packing cups. I am satisfied if that feature was looked into you would find that a decided reduction can be made in the removal of packing cups if they will just discontinue removing perfectly good ones and apply-

ing new ones in place of them and then throwing the good ones away.

In order to keep a further check on that I issued instructions that all packing cups removed should be held subject to the inspection of the foreman in charge of the department and if there was any doubt in his mind as to whether or not these cups should be removed and were in perfectly good order to be replaced again that they would be held subject to the inspection of the air brake inspector. I am satisfied that we are going to make a material reduction in the number of packing leathers applied to our equipment, and at the same time maintain the air brake equipment in better order.

C. G. Juneau (C. M. & St. P.): We have carried on quite a number of extensive investigations in regard to delays of equipment on account of bad order, and in checking up some 80,000 cars the greater percentage of the delays were caused by air brake failures which leads us to believe that we are not paying enough attention to that very important part of the equipment. I feel that all of the railroads should pay more attention to their air brake equipment when they have it on the repair track than is being done at the present time.

H. W. Coddington (N. & W.): I might throw out a helpful hint along the line that Mr. Giles talked of with regard to the removal of composition cups on account of leakage. We have been following composition cups ever since the development of the J-M. One thing about the composition cup is in the application. The cup is not compressible like the leather cup, and unless the men handling it are cautioned they are likely to put on the follower and, tighten the nuts the same as before, with the result that the man testing out the brake gets a blow past the sleeve. He thinks it is a leaky cup and takes it off.

It would be the natural expectation that with the introduction of the composition cup we would find competition in producing a better leather cup. Unfortunately I fear that is not true. It does not seem to have developed that way down in our direction. We have had on several occasions perfectly new cups, that looked from the outside to be perfect leather cups but you spread them out and moisten them on one side with saliva, put your mouth to the opposite side and blow bubbles through. With leather of that character you can't expect to hold air brake pressure.

Stencilling Uncleaned Triples

Chairman Tatum: I am rather surprised that there has not been more activity on the part of all of you regarding this paper. During the past year I have had brought to my attention triple valves on cars stencilled as cleaned on which the triple valves were not cleaned. I have seen the dirt collectors stenciled as having been cleaned, when they were not cleaned because you could not drive a nail through them, let alone air. Your retaining valves have been marked cared for or charged for as being cleaned when they have not been properly cleaned. Perhaps some of the committees that work on this brake work can think of a means by which the triple valve would be required to be taken apart and marked somewhere inside so that it would insure that the valve be dissected in detail before it is replaced in condition to be applied on the car. That will assure you that the triple valve is being treated. I believe too, the dirt collector ought to be taken from the car and taken to the shop and we ought to get another dirt collector out of the shop and the same in connection with the retaining valve. If we are going to allow the men to do these things on the repair tracks where we have not got supervision to watch them we are apt to get some work poorly done. It is up to us to find some rule that will cause this work to be done right or make it expensive to do it wrong.

Mr. Giles: I would like to suggest that the Price Committee be requested to give consideration to fixing prices for packing leathers of other types that are being introduced or offered in addition to those that already appear in the price list. They provide prices here for the Wabco and J-M and the leather packing but there are others being offered that are claimed to be equal to or superior to these for which prices have not been fixed, and it strikes me we ought to have prices for all those that are available.

Piston Travel

G. Wood (A. T. & S. F.): I want to answer the question on piston travel. This suggestion we made here for a modification in Rule 15 is in accordance with the instructions that have been revised and are now ready for distribution and which cover both freight and passenger cars. With the brake equipment generally

in service on passenger cars the range of seven inches to nine inches with a maximum of nine inches is within all the requirements of the service. So far as the range is concerned there is no difference between six inches and eight inches and seven inches and nine inches, and I presume that the gentleman has something in his mind in connection with the maximum of nine inches.

With regard to the brake cylinder packings, Rule 101 specifies leather, J-M or Wabco. Rule 101 does not exclude all other packings that are on the market if they are of the same type and the same efficiency.

The committee would like to get information as to your experience with the various types of composition packing. We know what your experience has been with leather packing. We are not sold on the composition packing. We know that the leather packing will stand more abuse than the composition packing will; that is, leather packing will run longer in cylinders that damage packing than composition packing will. On the other hand, we know that it is easier to make a cylinder tight with composition packing than it is with leather packing and easier to maintain it so far as the packing itself is concerned.

Our recommendation for the variation in the size of brake cylinders is to assist in maintaining tight cylinders. What the brake committee wants is to try and get such recommendations as will enable us to put a freight car in service and run it from one cleaning period to the other.

G. E. Terwilliger (N. Y., N. H. & H.): In regard to brake cylinder packing there is room for improvement as far as the structure of the packing cup is concerned. There are two types of composition packing now. Some of those packings lose their flexibility in cold weather. There are other cases where the composition packing wears down to the thread. When that condition develops you have a brake cylinder leakage that is prohibitive. Some of our members are reluctant to accept tests of packing in any one particular service. There are those who think that packing should be subjected not only to passenger but freight and mixed service. Some of the figures that we might secure have been obtained by passenger car test but I do not know as it makes any difference how we establish certain definite facts. If those facts are well established I think that will suffice. A great many packings are damaged in the application. A great many cylinders have a cutting edge and I think it would be well to form the practice of taking a mill file and rounding off the edge.

Mr. Fetters: Mr. Wood states that seven inches to nine inches piston travel is in effect about the same as six inches to eight inches as far as service is concerned. I can't agree with that because it is one inch greater all the way down the line. Now the maximum of nine inches piston travel standing test certainly means about 10 in. in running. When you get to 10 in. it is evident that the braking power is materially reduced and you are consuming more air.

Mr. Wood: If you use the type of equipment that employs safety valves, triple or control valves and you carry from 90 lb. upwards of brake pressure there is very little difference in the brake effort for brake service or emergency brake. If your brake pressure is above the ordinary 70 lb. and you make the full service application the equalization is the same as it would be if you had a six inch or a five inch piston travel because you reach the safety valve adjustment. If you attempt to go higher you simply blow the rest away. When you make an emergency application it is only a difference of a pound or so in cylinder pressure. The nine inch piston travel is not going to hurt you unless you carry a low brake factor. If you do, it will only make a difference of three or four pounds for service and about a pound or so for emergency. I thought the gentleman had in mind the foundation brake gear that was influenced largely by the maximum piston travel. If he hasn't, then don't worry about the long travel because the longer you can run your piston travel the better your trains are going to be handled. I believe the C. M. & St. P. has just determined for their own satisfaction that more cylinder volume is what they need. This road is applying a cylinder with larger volume on its cars so that it can get away from a harsh action of the brakes due to the short piston travel.

W. F. Peck (B. & O.): What wears out the packing cups is rust. There is no question about the fact that rubber has abrasive qualities that are not present in leather. I think there has been a misunderstanding about composition cups. When the Wabco cup was first brought out it seemed to be the consensus of opinion that anything in the way of grease or oil could be used to lubricate the cylinder. We did not find that true. In handling 1,750 cyl-

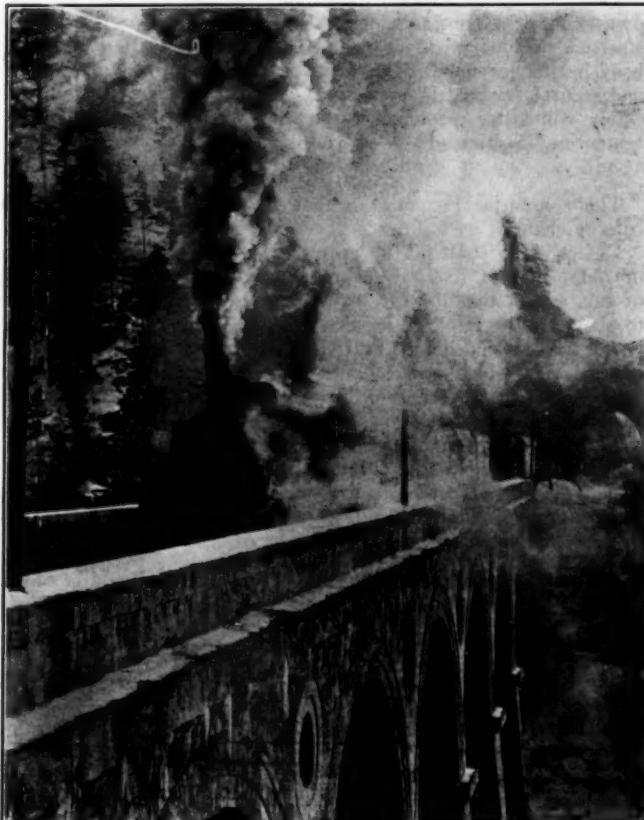
inders through the Glenwood shops we found that you have got to have a high grade brake cylinder lubricant. Otherwise you will get rust and your cylinders will cut out the cups at that point. I venture to say that nearly a thousand cylinders had to be treated with emery paper or emery cloth to get the rust out of them before we could put the cups in. We do not find that true with the lubricant that we use with the Wabco cup.

Moisture in Brake Cylinders

S. Zwright (Northern Pacific): This has been a very live subject for several years past, particularly in passenger service. We are particular about the condition of the brakes. They are tested at the terminal and if every brake does not remain set, it has got to be put in operating condition before the train moves. We don't have much trouble during the summer months but in the winter time we have difficulty. I have taken the position that the Wabco cup was not flexible enough. Most of the difficulty is on our sleepers and cars that have the steam heat with drips pretty close to the brake cylinder, so we put shields around the drips to the steam heat system with the expectation of keeping the moisture out. We overcame it to some extent, but last winter we started a train out of Seattle that had been put in good shape. About half way over the system the brakes would not all set. We warmed them up a little, took the head off and they worked all right. So we concluded that all the difficulty was not in the cup. It was in the moisture in the brake cylinder. Our man at Seattle went over the trains there and if the leather was in good shape he gave it a good oiling and put in a gasket. That kept the moisture out.

Mr. Wood: Relative to the committee's position on piston travel, that subject is virtually closed. The General Committee has approved revised rules as gotten out by the Brake Committee and the Bureau of Safety in conjunction with the Safety Appliance Committee. What the committee wants to do is to give you a piston travel that will give better handled freight and passenger trains, and we hope you will adhere to those instructions and point out to the committee whether it is right or wrong.

The report of the committee was accepted and the recommendations made therein referred to letter ballot.



A Freight Train in Austria

Report of Arbitration Committee

New Rule 44 recommended to establish the responsibility of the car owner for repairs under certain conditions

During the year Cases 1,333 and 1,383, inclusive, have been decided and copies sent to the members. A vote of concurrence in the decisions is requested by the committee.

Considerable variance has been noticed during the past year as to the course of the procedure in submitting cases for arbitration. The fundamental principles governing this procedure are re-stated in the report. All recommendations for changes in the rules of interchange submitted by members, railroad clubs, private car owners, etc., have been considered and, where approved, changes have been recommended.

Recommended Changes in the Rules of Interchange

Changes or additions in the text of the rules, as far as possible, are shown in italics.

RULE 2

The committee recommends that the second paragraph of Section (b) be modified as follows:

For inside door protectors, *side or end*, the car transfer check, etc.

RULE 3

The committee makes the following recommendations; that the effective date of the second paragraph of Section (b) be extended to January 1, 1927; that the effective date of the second paragraph of Section (d) be extended to January 1, 1928; that the effective date of the next to last paragraph of Section (e) be extended to January 1, 1927.

The committee recommends that the effective date of Section (i) be extended to January 1, 1927, and that the section be modified as follows:

Cars built new on or after January 1, 1927, will not be accepted from owner unless equipped with steel underframe having a minimum cross sectional area of 24 square inches between the draft back stops.

Cars built prior to January 1, 1927, will not be accepted from owner on or after January 1, 1928, unless equipped either with steel underframe, wood or metal draft arms extending beyond the body bolster, or metal draft arms extending to metal body bolster and securely riveted to same.

The committee recommends that the effective date of the second sentence of Section (1) be extended to January 1, 1927.

RULE 4

The committee recommends that the second paragraph of this rule be changed as follows:

Defect cards shall not be required for any slight damage (new or old), that of itself does not require repairs before reloading of car, except that the car may be used, under load, in movement to shop for the required repairs.

The recommended modification is a reasonable exception to the general rule which contemplates that cars with defects requiring repairs shall not be continued in service indefinitely. The general restriction against reloading defective cars is advisable as a measure against the issuance of defect cards for unnecessary repairs.

With reference to the second sentence of the present rule, the experience has been that in many cases it is practically impossible to determine whether the defects were new or old.

RULE 9

The committee recommends that make or name should be omitted from the information to be specified on billing repair cards after item of brake beams, R & R.

RULE 17

The committee recommends that Section (e) of this rule be modified as follows:

A. R. A. No. 2 or A. R. A. No. 2 plus brake beams may be used in repairs to all freight equipment cars equipped with non-A. R. A., A. R. A. No. 1, or A. R. A. No. 2 brake beams; charges and credits to be on basis of beams applied and removed. A. R. A. No. 2 plus and A. R. A. No. 3 brake beams must be replaced in kind.

RULE 30

The committee recommends that Section (g) of this rule be modified as follows:

When a car is reweighed and remarked the car owner must be promptly notified of the old and the new weights, with place and date. The proper officer to whom these reports should be made will be designated in The Official Railway Equipment Register.

RULE 32

The committee recommends the addition of a new second paragraph to this rule to read as follows:

Steel tank heads (on tank cars), burst, except when due to inferior material, material less than required thickness, omission of reinforcing shoes where required, burned in flanging, welds or other improper workmanship; in any of such cases handling line must furnish car owner with statement showing actual condition of tank head which caused the failure.

The committee recommends that Item 4 of Section (d) of this rule be changed as follows:

No rider protection when necessary, if car is damaged to the extent shown in Rule 44. The same responsibility applies also, if car is damaged to the same extent (per Rule 44), due to defective, ineffective or inoperative hand-brake rigging, while handling car with rider protection, even though such faulty conditions may have developed during the switching operation.

The elimination of Item 4 from Section (d), and the substitution of combination factors on certain classes of tank cars to constitute handling line responsibility, as proposed by the American Petroleum Institute, is not concurred in.

The claim for this additional protection is based on the premise that tank cars comply with the tank car specifications of the American Railway Association, in some instances exceeding them, and that therefore, any damage to the sills must of necessity be the result of improper handling.

The fact that tank cars when built meet the A. R. A. tank car specifications does not of itself guarantee against subsequent failures of sills, etc., in fair service, resulting from deterioration or accumulation of strain and fatigue. Failure of buffer castings is of frequent occurrence in fair service, resulting largely from defective or inadequately maintained draft gears and coupler back stops. In this same connection, the coupler is also subject to failure although conforming to the Specifications.

The committee recognizes that under the present Rule 32 owners are obliged to assume responsibility for extensive damage to cars, some of which may have been due to improper handling, particularly by excessive impact, and, therefore, with the view of placing upon handling lines a greater measure of responsibility for the careful handling of equipment and, further, to encourage a higher standard of hand brake maintenance, the above changes are justifiable.

The committee recommends that Item 5 of Section (d) of this rule be modified as follows:

Coupling on with locomotive when first car is damaged, including damage to adjoining cars (in consecutive order) in same draft.

The committee recommends the elimination of the last paragraph of this rule as it has been covered by the second paragraph of Rule 4.

RULE 33

The committee recommends that the first paragraph of this rule be modified as follows:

Owners will be responsible for the expense of repairs to safety appliances where not involved with other delivering line damage, except on tank cars when sideswiped or cornered.

RULE 43

The committee recommends that the note under this rule be eliminated as it is covered in the new Rule 44.

The committee also recommends that the Interpretation No. 2 of this rule be eliminated on account of the new second paragraph of Rule 32.

NEW RULE 44

The committee recommends a new rule, to read as follows:
When a car is damaged to the extent shown below, if it occurred in ordinary handling, a statement must be furnished showing the circumstances under which the damage occurred in order to establish the responsibility of the car owner for the repairs. This statement, in the case of cars reported under Rule 120, to accompany request for disposition of car, and, in cases where it is not necessary to report the car under Rule 120, to accompany the bill for repairs.

(1) Six or more longitudinal sills on wooden underframe cars; however, if not more than three sills are broken new, the renewal or splicing of the remainder being necessary account of decay, elongated bolt holes or other old defects, a statement as to the existence of such old defects will be sufficient evidence of the responsibility of car owner for all repairs, providing after a thorough investigation it was not found that car was subjected to unfair handling as provided by Rule 32.

(2) Five or more longitudinal sills on composite wooden and steel underframe cars.

(3) Four or more steel longitudinal sills on steel or steel underframe cars.

(4) All longitudinal sills on all-steel underframe cars having but one steel center member.

(5) Two steel center members on tank cars having two steel longitudinal sills only.

(6) Steel tanks of tank cars shifted where secured by bolster or center anchorage.

(7) Saddle sheared from tank, or tank sheet buckled between saddle castings, or damage to both draft members on same end of car, on tank cars without center sills.

Note: Draft members, wood or steel, extending from end sill to end sill and used to reinforce center sills, are not longitudinal sills.

Reason: In view of the recognized weakness of many of the wooden underframe cars due to decay or other old defects in the sills, which are unquestionably owners' defects, and the impossibility of determining the actual circumstances under which the final failure occurs in such cases, the handling line is entitled to a greater measure of protection than is afforded under the present rule. The insertion of the note with reference to continuous draft members is considered necessary for a uniform understanding.

RULE 60

In order to prohibit the cleaning of air brakes until after the expiration of eleven months, unless car is shopped for other repairs or the air brakes are defective, the committee recommends that the second paragraph of this rule be changed as follows:

After the expiration of nine months, if car is on repair track for other repairs, the air brakes may be cleaned at same time. After the expiration of eleven months, the air brakes may be cleaned irrespective of whether car requires other repairs.

RULE 76

The committee recommends that this rule be changed as follows: Tread worn hollow—cast iron and cast steel wheels: if the tread is worn so that projection on under side of gage does not come in contact with tread of wheel. (See Fig. 4-D), or rim liable to breakage.

Tread worn hollow—wrought steel wheels: if height of flange is $1\frac{1}{2}$ inches or over, as measured with standard steel wheel gage (see Fig. —), or approved equivalent.

Note: The drawing of the standard wheel gage will be shown in the 1925 report of the Committee on Wheels.

RULE 86

The committee recommends that the wheel seat dimension for the 70,000-lb. capacity axle, shown in the table under Section (a) of this rule, be changed from $5\frac{5}{8}$ in. to $5\frac{3}{4}$ in., as recommended by the Committee on Car Construction.

The committee recommends that standard Class "F" axles be added to the table under this rule as follows:

A Total weight on rail	B Nominal capacity	Limits of Wear						Dimensions, New					
		C Lb. Lb.	D In. In.	E In. In.	F In. In.	G In. In.	H In. In.	C In. In.	D In. In.	E In. In.	F In. In.	G In. In.	H In. In.
251,000	200,000	6	$7\frac{3}{4}$	$6\frac{3}{4}$	$12\frac{1}{2}$	34	$6\frac{1}{2}$	$8\frac{1}{2}$	$6\frac{1}{2}$	12	7	$8\frac{3}{4}$	$3\frac{1}{2}$

The committee recommends that the second, third and fourth paragraphs of Section (b) of this rule be changed as follows:

A. R. A. Standard axle shall be used to replace non-A. R. A.

Standard axles of like capacity when over-all length conforms to A. R. A. Standard, and shall also be used to replace A. R. A. Standard 60,000 lb. capacity axles having wheel seat less than condemning limit for such axle, at expense of car owner, except that in case of delivering line defects the charge against owner shall be confined to the difference in value between the non-A. R. A. Standard axle or A. R. A. Standard axle removed and the A. R. A. Standard axle applied.

Non-A. R. A. Standard axles may be used to replace non-A. R. A. Standard axles in kind, until January 1, 1928, only in such cases where A. R. A. Standard axles are not a proper substitute.

The fourth paragraph is eliminated.

RULE 91

The committee recommends that the last sentence of Section (c) of this rule be omitted, a new paragraph be added as Section (d), and that present Sections (d) and (e) become new Sections (e) and (f) respectively, as follows:

(d) If objections to bill, as per Sections (b) and (c), do not amount to \$1.00 in aggregate no exception shall be taken, but bill shall be passed for payment as rendered. In any case, however, if entire bill is improperly rendered, it may be returned regardless of its amount.

RULE 98

To simplify billing transactions, the committee recommends the addition of a new paragraph to Section (g) of this rule, as follows:

The amount of service metal on both wheels will be governed by the minimum amount on either wheel, except when a defective wheel is necessarily scrapped before it reaches the limit of wear, in which case the service metal on mate wheel will be credited on basis of the actual amount.

RULE 101

The committee recommends that Items 127 and 128 of this rule be eliminated and that Items 132 and 133 be modified as follows:

Item 132: Coupler body, A. R. A., one, new, or second-hand, steel, 5 in. by 7 in. shank charge \$9.41, credit \$1.10.

Item 133: Coupler body, A. R. A., temporary standard, one new or second-hand, steel, 5 in. by 7 in. shank charge \$10.35, credit \$1.23.

RULE 104

The committee recommends that first two paragraphs of this rule be modified as follows:

Second-hand A. R. A. couplers or parts shall be charged and credited at 75 per cent of value new, except that new or second-hand coupler body, steel, 5 in. by 7 in. shank, former standard or temporary standard, shall be charged and credited at prices specified in Items 132 and 133 of Rule 101. Credits shall be confined to the body, lock, knuckle and knuckle pin, whether second-hand or scrap. In the Type D coupler, credit shall be allowed for all parts.

When new A. R. A. coupler is applied it shall be so charged whether or not it is of same make as that removed, except that where new coupler body, steel, 5 in. by 7 in. shank, former A. R. A. standard or temporary standard, is applied it shall be charged at value shown in Items 132 and 133 of Rule 101.

Passenger Car Rules of Interchange**RULE 2**

The committee recommends that the first paragraph of this rule be modified as follows:

Cars, loaded or empty, offered in interchange with defects for which owner is responsible, provided they are equipped with air brake, air signal and steam heat train line having end steam valves and otherwise meet the requirements of the receiving line as to safety and clearances, must be accepted, with the following exceptions:

RULE 7

The committee recommends that Item 4 of Section (f) of this rule be revised to conform to the recommended revision of freight car Rule 76.

RULE 8

The committee recommends that Section (c) of this rule be modified as follows:

Cast-iron wheels in place of cast-steel, wrought-steel or steel-tired wheels; cast-steel wheels in place of wrought-steel or steel-tired wheels; steel-tired wheels in place of wrought-steel wheels.

The members of the committee are T. W. Demarest (Chairman), Penna.; F. W. Brazier, N. Y. C.; J. Coleman, Canadian National;

W. H. Fetner, M. P.; J. J. Hennessey, C. M. & St. P.; J. E. O'Brien, Seaboard Air Line; H. L. Shipman, A. T. & S. F., and G. F. Laughlin, Armour Car Lines.

Discussion

Mr. Shipman: Some of the roads using the No. 2 beams claim this should receive the same consideration as the No. 2 plus in billing transactions. The committee has decided to withdraw the recommendation for the change in this rule in order to

avoid the complications in billing that would result if each beam had to be maintained in kind in view of many cars equipped with mixed beams and there being no means of determining which type is standard to the car in making repairs.

With reference to Rule 32, Item 4, Section (d), the committee wishes to cross out the word "ineffective" due to there being a possibility of the word being misconstrued. It was not the intention to cover owner's responsibility there in the way of hand brakes that were not up to the standard, or otherwise of poor design.

The report was accepted as presented.

Prices for Labor and Materials

Change of prices take a downward trend—Complete revision of Rule 112

The committee submitted the following report under A. R. A. Interchange Rules 101, 107, 111 and 112 and the freight car code Rule 22.

Prices for Materials—Rule 101

New prices are provided for reinforced doors on automobile and refrigerator cars. Items 125 and 128 are eliminated and items 132 and 133 changed at the suggestion of the Arbitration Committee.

To discourage the practice of cars being held out of service awaiting receipt of friction gears from the owners, and to facilitate the preparation and checking of bills, the committee has recommended a proposed addition to Rule 101. The new prices proposed are to be charged for various friction draft gears applied new complete, when necessary to apply complete gear on account of any or all parts of old gear becoming defective. In conformity with Rule 88, one type of gear may be substituted for another if the type substituted conforms to the one removed as to sill spacing and coupler pocket limits. In such substitution complete gears removed shall be credited at 25 per cent of the price new, complete, when removed on account of defective friction casing or castings, and at 50 per cent of the price new, complete, when removed on account of any other part or parts of the gear being defective.

Second-hand complete friction draft gears shall be charged at 75 per cent of the price new, complete.

When new or second-hand parts of any type of friction draft gear are applied in replacement of such parts becoming defective, they should be charged at the factory prices, as new, plus 15 per cent.

New Item: 16-a—Arch bar, on trucks without column bolts and with channels riveted to arch bars, one or all on same side, R & R or R, charge on bolt and rivet basis. Add jacking of car when necessary.

New Item: 19-a—Cylinder body, combined type (body only), charge for 8-in. \$5.47, and for 10-in. \$6.60.

New Item: 19-b—Cylinder, complete, detachable type (without push rod), Nos. 69817-69751, charge for 8-in. \$12.32 and for 10-in. \$16.80.

New Item: 19-c—Cylinder complete, combined type (without push rod), Nos. 69816-69818, charge for 8-in. \$11.07 and for 10-in. \$15.55.

New Item: 108-a—Brake connection, bottom, forged, hollow design, price of each \$2.40; credit \$0.12.

New Item: 142-a—Coupler cross key lock, U type, price for each unit \$.055; credit \$.005.

New Item: 156-a—Half door or twin door, reinforced type, for the side of an automobile car, price for each applied \$19.00. No credit for scrap.

New Item: 156-b—Half door or twin door, right hand with fixtures, for the side of refrigerator cars, wooden, price of each applied \$24.45. No credit for scrap.

New Item: 156-c—Half or twin door, left hand, for the left side of refrigerator cars, wooden, price of each applied \$17.38. No credit for scrap.

Prices for Labor—Rule 107 and 111

Investigations reveal that no change is warranted at this time

in existing labor allowances per hour as set forth in Items 427, 442 and 443.

The report recommends several changes in the wording of items in Rule 107 to define more clearly what is included in the time allowances, some of which are changed, and the following new items are added:

New Item: 121-a—Coupler cross key lock, U type, R & R or R, when coupler cross key is not R & R or R. Ordinary refrigerator cars—3 hr.

New Item: 317-a—One end sill, flush type, on open top cars, renewed, includes R & R or R of end stakes outside of car. (No extra charge for coupler R & R or R at the same time.) Ordinary car—9 hr.

New Item: 319-a—One end sill, flush type, on open top cars, renewed when one or more defective sills are renewed or spliced, includes R & R of end stakes outside of car. Ordinary car—7 hr.

Destroyed or Damaged Cars—Rule 112

The committee recommends a complete revision of Rule 112 in line with the slight reductions occurring in the market prices.

The following addition has been proposed to be added to this rule: A refrigerator car is either an RA, RB, RM or RS car as defined in Section L of the A. R. A. Manual. All VS, VA, Eastman Heater and other special types of house cars should be set-tled for on a box car basis.

Interchange Rule 22

It is proposed to change the price of Pintsch gas per receiver set from \$1.54 to \$1.60.

The report is signed by A. C. Calkins (chairman), N. Y. C.; Ira Everett, Lehigh Valley; J. K. Watson, A. T. & S. F.; T. J. Boring, Penn.; H. H. Harvey, C. B. & Q.; H. H. Boyd, Canadian Pacific; A. E. Smith, Union Tank Car Company, and M. R. Esherwood, Swift & Company.

Discussion

A. E. Calkins (N. Y. C.): Items 179 and 187 contain allowance for refrigerator cars. That should come out.

The report was adopted as presented by the committee.



Built by the American Car & Foundry Company

Report on Couplers and Draft Gears

Definite plans for draft gear drop test machine now under way—Minor changes in type "D" couplers

In order that the subject of draft gears might be exhaustively studied, the committee recommended, under date of December 6, 1924, that the sum of \$50,000 be appropriated to cover the cost of designing, building and housing a 27,000 lb. drop test machine together with the necessary recording apparatus.

This recommendation was unanimously approved by the General Committee, and the Board of Directors on March 20, 1925, authorized an appropriation of \$50,000 for constructing a drop test machine as recommended. The necessary steps are being taken in arranging for the detail plans and building of this machine, determining upon the most suitable location for its installation, and erecting it, all of which under the direction of the Mechanical Division and with the supervision of the president of the Association will be brought to as speedy a conclusion as possible.

The information that will be developed by this testing machine will be of the greatest value to the railroads as strictly comparable data on the performance of draft gears of different designs, both new and after periods of wear in actual service, will be available.

From the information to be obtained, suitable specifications are to be prepared for the purpose of eventually restricting the use of draft gears to those that are known to meet the prescribed standards of efficiency and through the experiments to be conducted obtain such facts and information as will assist in the development of draft gears generally.

Couplers Other Than A. R. A. Standard

The present specifications for purchase and acceptance of A. R. A. Standard "D" couplers, knuckles, locks and other parts make no reference to couplers of former types which are being ordered for repairs and will be required until the disappearance of cars of design not suitable for the Standard "D" coupler.

It is felt that the static and dynamic tests formerly required for M. C. B. couplers should be dispensed with and that for such types the tests need cover the quality of the material only.

To meet this situation the note now appearing under the title of the present specifications for Standard "D" couplers should be revised to read as follows:

"These specifications replace specifications for M. C. B. automatic couplers adopted in 1899. When couplers other than type "D" are ordered under these specifications, they shall conform to the requirements for quality of steel, workmanship, and details of inspection. No tests of the couplers as a whole will be required."

It is recommended that the reissuance of this note be referred to letter ballot.

Failure of Cotter Securing Draft Gears

Attention is directed to the frequent failure of the various forms of cotters in general use for securing cross draft keys in place. These cotters are failing both on account of being worn away due to contact with the draft castings, and from being sheared off due to lateral movement of the coupler and draft key when curving.

The washers encircling the cross draft key used by some roads greatly improve the conditions resulting from wear but are of no benefit as concerns shear.

An investigation conducted by your committee shows that while the failure of these cotters is most frequent in the front cross draft key it occurs to a considerable extent in all keys. Cases have been observed of U-shaped cotters made of $\frac{5}{16}$ in. steel being sheared off on new cars when being moved over curves.

It is proposed to cover this matter in a circular to the members as soon as it has been determined which of certain methods under consideration for correcting the trouble are most satisfactory.

Standard "D" Couplers—Minor Changes

In order to determine how the Standard "D" couplers and parts are standing up in service and whether any changes in the

detail design should be made, the roads represented on your committee have arranged for special examination and report on each Standard "D" coupler or part requiring renewal during a period of six months.

These reports will be consolidated to show just what is taking place and should indicate clearly whether the present coupler is equal to the service conditions encountered, and whether any modifications in design should be made. The results of this investigation will be included in our report to next year's Convention.

Your committee has authorized a few changes of a minor nature in the detail designs of the standard "D" coupler and gages, none of them in any way affecting interchangeability or strength of the parts, and all of them being agreed to by your committee and the mechanical committee of the coupler manufacturers and the standard drawings on file corrected accordingly.

The report was signed by R. L. Kleine (chairman), assistant chief of motive power, Penna.; J. R. Onderdonk, engineer of tests, B. & O.; C. J. Scudder, superintendent motive power and equipment, D. L. & W.; J. A. Pilcher, mechanical engineer, N. & W.; C. B. Young, general mechanical engineer, C. B. & Q.; Samuel Lynn, master car builder, P. & L. E.; L. P. Michael, mechanical engineer, C. & N. W.; E. A. Gilbert, general master car repairer, S. P.; and Prof. L. E. Endsley, University of Pittsburgh.

Discussion

Mr. Kleine: You may be interested in knowing just what the present status is of the drop test machine. I have this report from the chairman of the sub-committee on tests.

"The sub-committee has inspected in detail the recording devices of the Union Draft Gear Company and W. H. Miner, Inc., at Chicago, and has interviewed Tinius Olsen and Riehle Brothers of Philadelphia; also the Southwark Foundry & Machine Company, Philadelphia. We have obtained from the different draft gear manufacturers, blue prints of their largest gear which have in turn been forwarded to Tinius Olsen and Riehle Brothers.

"The Southwark Foundry & Machine Company's engineers were away when the committee called but we left our proposed specification for a drop with this company. To date we have heard nothing from them. Both Tinius Olsen and Riehle Brothers are working up a tentative sketch for the drop and expect to submit it in the near future."

We canvassed various railroads in regard to the location of the drop test machine, but the General Committee has decided that it will probably be best to locate it at some accessible university, and your committee will naturally be governed accordingly.

Mr. Ripley: I am wondering if it may not be a mistake to lighten up on the specification requirements for these old couplers. Most of us have had the experience that those couplers are giving a great deal of trouble, and any safe-guard we can throw around testing them at the manufacturer's plant appears to be an advantage. I do not quite understand the committee's viewpoint on this. I have in mind the tests we are making on the Simplex couplers, for example, the full jerk tests which are made at the plant.

Mr. Kleine: The drop tests that were made on the bodies and on the knuckles were altogether design tests and they were necessary at a time when we did not have a standard design, but those designs are not being changed today. Therefore, there is no necessity for continuing those drop tests, and all that you desire to be assured of is that steel of a proper quality is being used.

It would be foolish to continue the drop tests as the drop tests were purely design tests and that is the reason that the committee recommended that all that will be necessary is the same tests that are provided for the standard D couplers insofar as proper grade of material is concerned.

The report was accepted and referred to letter ballot.

Report of Loading Rules Committee

New methods of loading small tanks, concrete pipe and wide plates proposed in rules revisions

During the past year the committee has been in conference with the automobile shippers and the steel industries on the subject of Loading Rules as applied to their products. These shippers, as well as others, have placed before the committee a number of recommendations for changes and additions to the Rules. Trial shipments involving new methods of loading small diameter tanks, concrete pipe and wide plates not adequately covered by the Rules were followed through to destination in order to determine whether they were practical and safe.

As a result of its investigations the committee submits the following changes and additions to the Rules for approval and submission to letter ballot for adoption as standard of the Association.

Changes in General Rules for the Loading of Materials on Open Top Cars

Rule 13, First Paragraph—The width of overhanging loads placed on single cars, *when flat cars are used as idlers*,

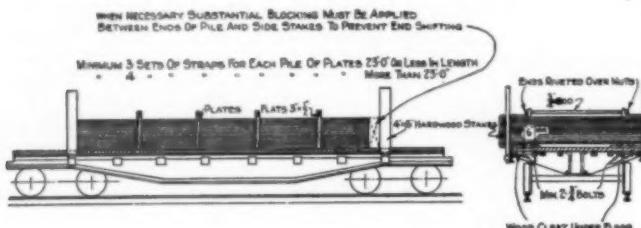


Fig. 44E—Manner of Securing Wide Plates Loaded on Flat Cars

must never exceed the following dimensions as a maximum and the load must be governed by the total length of lading and weight limits prescribed in table under Rule 23 for the length of car used. *When gondola cars are used as idlers see limitations prescribed in Rule 221.*

Rule 28—Bearing-pieces must never be placed between bolster and end of car, unless special provision (*See Rule 217*) is

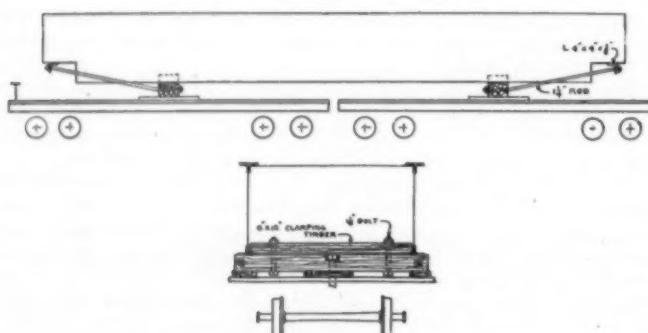


Fig. 76A—Loading of Turntables

made therefor in detail instructions. (The remainder of the paragraph is unchanged).

Changes in Rules Governing the Loading of Lumber, Logs, Ties, Etc.

Rule 100—The following is added to Section B:

Height of load given is measured either from floor line of flat cars or from top of sides of gondola cars.

Section C. For loads of lumber or timber, not of equal thickness which cannot be lapped or stripped, the sizes of hardwood stakes must not be less than 4 in. by 4 in.

EXPLANATION: Sections B and C are revised to conform with the second paragraph of Rule 102.

Changes in Rules Governing the Loading of Structural Material, Plates, Etc.

Proposed New Rule 201-A—When plates are too wide to be loaded in accordance with Rule 201 they may be loaded in accordance with Fig. 44-E. When so loaded there must be at least three tie straps, each not less than $\frac{1}{2}$ in. by 3 in., to each pile of plates 23 ft. or less in length and four tie straps, each not less than $\frac{1}{2}$ in. by 3 in. for each pile of plates over 23 ft. in length.

Each tie strap must be secured by not less than two $\frac{1}{4}$ -in. bolts spaced at least 6 in. apart and passing through floor of car with cleats under floor 2 in. by 4 in. by 18 in. The material must be placed against stakes not less than 4 in. by 5 in. at one end of the car and at the opposite end two stakes not less than 4 in. by 5 in. must be placed in the nearest stake pockets to the end of the load. If there is any space between the end of the load and stakes, this space must be built up as per Fig. 44-E to prevent end shifting. Care must be taken to have the straps fit the load snugly and the tops of the clamps must be tied together by $\frac{1}{4}$ -in. rods with ends riveted over nuts.

EXPLANATION: Numerous shipments have shown this method clamping to be satisfactory and it takes care of wider plates than now provided for in the rules.

Rule 203—Gondola cars loaded with plates or other material on floor of car may have plates that are too wide for the car loaded on top of car sides when height of sides does not

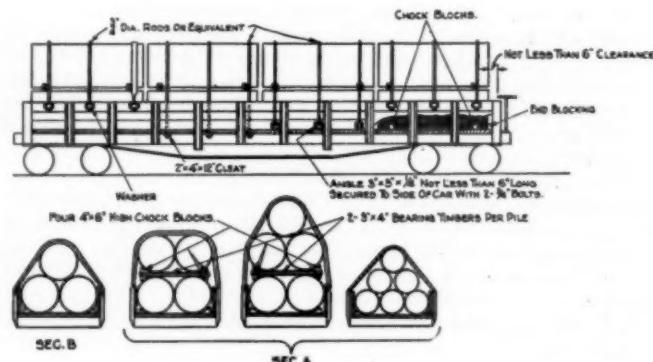


Fig. 101A—Manner of Loading Small Diameter Tanks on Flat and Gondola Cars

exceed 3 ft. (See Fig. 45 or 45-A). Such superimposed plates must be supported by posts 4 in. by 6 in., one set of posts for each 6 ft. length of lading, with a minimum of three sets of posts for each tier of plates. Side motion to be prevented by not less than three clamps constructed as shown in Figs. 45 or 45-A. Longitudinal motion to be prevented by uprights, 4 in. by 6 in. bolted to side of car with $\frac{1}{2}$ -in. bolts and backed up by struts 2 in. by 8 in. spiked or bolted to sides of car. Total weight of plates loaded in this manner must not exceed 75 per cent of the Load Weight, as per General Rule 5.

EXPLANATION: Rule revised to prevent end shifting of the plates. It was found by experience that the diagonal struts split readily when placed directly against the plates.

Rule 211—When one or both bearing-pieces are placed on the car floor they must be located over the car body-bolster or between car body-bolsters, and must never be placed between car body-bolster and end of car unless special provision (*See Rule 217*) is made therefor in detail instructions. When one or both bearing-pieces are placed on top of car sides they may be located

within 12 in. either side of the center line of the freight car body-bolsters.

Rule 222—The idler used with loads as shown in Figs. 54 and 55 may be a low side gondola car, but must have at least 4 in. clearance vertically between load and idler body or brake shaft.

Rule 247—The bolsters may be held to the turntable in the manner shown in Fig. 76, or if rivet holes are available in the lower flanges, they may be held with four $\frac{3}{4}$ -in. bolts at each end. Another method of securing the bolsters to the turntable by clamping to the inside flanges is shown on Fig. 76-A. When turntables of the straight girder type are loaded in this manner, rods to prevent end shifting must be applied as shown in the figure. The bolsters must be secured to the car by a center pin $2\frac{1}{2}$ in. in diameter, passing through bolster, center-plates and top timber of cribbing or floor of car.

EXPLANATION: An alternate method of clamping the turntables to pivoted bolster has been provided at the request of the shippers.

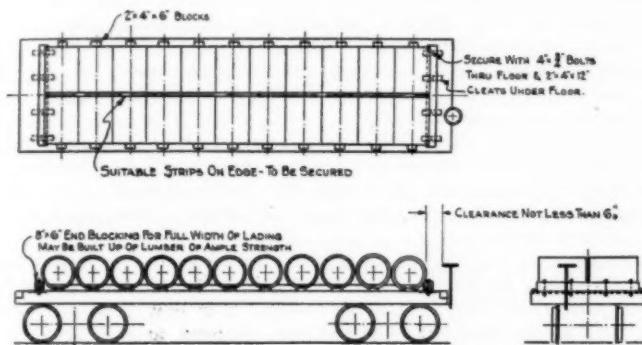


Fig. 109A—Manner of Loading Concrete Culvert Pipe on Flat Cars

Trial shipments showed this method of securing the turntable to be satisfactory.

Changes in Rules Governing the Loading of Boiler Shells, Machinery, Etc.

Rule 302, New Paragraph—Small diameter tanks, when more than one tank can be placed longitudinally (side by side) on flat or gondola cars shall be loaded as follows: Tanks weighing less than 3,500 lb. each may be loaded three, four, five or six tanks per pile, as per Fig. 101-A, Sections "B" and "A". Tanks weighing 3,500 lb. or over, must be loaded three tanks per pile as per Fig. 101-A, Section "B". Tanks loaded four, five or six per pile must be secured by three rods or bands per pile and when

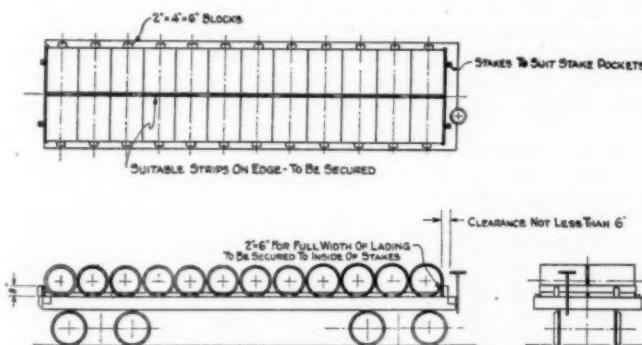


Fig. 109B—Manner of Loading Concrete Culvert Pipe on Flat Cars

loaded three tanks per pile must be secured by two rods or bands, rods or bands must be secured to side of car, stake pockets or floor of car with suitable nuts and washers or cleats; threaded ends to be riveted over or checked to prevent loss of nuts. Rods must be at least $\frac{3}{4}$ in. in diameter, and bands must be of equivalent strength, with bolt ends welded on. Each layer of tanks, when not loaded in pyramidal form must be separated by at least two 3-in. by 4-in. bearing timbers having 4-in. by 6-in. chock

blocks spiked to top and bottom of each bearing-timber. Side blocks on floor when loaded in gondola or flat cars, must be 4 in. wide by 6 in. high and applied as shown in Fig. 101-A for each pile of tanks, and when loaded on flat cars each block must be backed up by a 4-in. by 5-in. side stake. End blocking must be applied to other end of end piles. On gondola cars, the end blocking should be 4 in. by 4 in. spiked to floor with 60 penny spikes and on flat cars the end blocking should be 4 in. by 6 in. bolted to floor of car with four $\frac{3}{4}$ -in. bolts with 2-in. by 4-in. by 12-in. cleats under floor. Tanks less than 8 ft. in length having flat ends, may be loaded on end in gondola cars, providing they are securely blocked and braced to prevent end shifting and falling over.

Changes in Rules Governing the Loading of Concrete Culvert Pipe, Brick, Stone, Building Tile, Etc.

Rule 400—Manner of securing concrete culvert pipe loaded on flat cars: Pipe loaded on its side should be secured as per Fig. 109, 109-A or 109-B, the method shown on Fig. 109-B to be followed for pipe loaded crosswise of car, when cars are not equipped with end stake pockets. If loaded on end it should be secured as per Fig. 110.

EXPLANATION: New figures have been added to the rules to cover concrete culvert pipe loaded on its side crosswise of car. This method of loading is giving satisfactory results in actual service.

Rule 401, Second Paragraph—Where separating strips to cover lading clear of car floor are referred to in these rules, they should be sound wood, not less than three inches wide by one inch thick. (The remainder of the paragraph is unchanged).

EXPLANATION: Thickness of bearing-strips changed from $1\frac{1}{2}$ in. to 1 in. to overcome breakage of stone in transit.

Rule 417—Building tile, unless otherwise covered by governing Classification, loaded interlocked at doorway do not require door protection if built up as per Fig. 113, and packed tight to prevent motion between tiling. (The remainder of the paragraph is unchanged).

EXPLANATION: Reference to the Classification has been incorporated in the rule to avoid conflict between the Loading Rules and Rule in the Classification covering this class of material being shipped.

Changes in Rules Governing the Loading of Automobiles

Rule 518, Paragraph (i)—After loading, emergency brakes should be set, except on balloon tires, where it is optional.

EXPLANATION: To set emergency brakes on automobiles equipped with balloon tires will damage the brake mechanism, due to the fact that constant jar in the car on account of the resiliency of the balloon tires would spread the brake bands when the brakes are set.

The report is signed by R. L. Kleine (chairman), assistant chief motive power, Penna.; R. H. Dyer, general car inspector, N. & W.; E. J. Robertson, superintendent car department, Soo Line; Samuel Lynn, master car builder, P. & L. E.; G. R. Lovejoy, master mechanic, Detroit Terminal; T. O. Sechrist, assistant superintendent machinery, L. & N.; C. J. Nelson, chief inspector, Chicago Car Interchange Bureau, and R. B. Rasbridge, superintendent car department, Reading.

Discussion

Mr. Kleine: In addition to that we have a number of rules under investigation and new rules under consideration that we could not complete up to the time of the convention. I may state that the loading rules committee naturally works along the entire year and makes trial loads. When the shippers have a new commodity to load they come to the Loading Rules Committee and we send out experimental loads as designing the method of loading, and naturally after the experiments have been completed the shipper is very anxious to get approval of his method of loading and I would, therefore, ask the members if they will consider some subsequent recommendations which the committee will make for inclusion in the letter ballot and the committee will explain fully at the time of presenting it to letter ballot just what is involved.

The report was accepted subject to later changes as requested by the chairman of the committee.

Specifications and Tests for Materials

Changes proposed for axles, forgings, boiler and rivet steel, pipe, paint materials—Specifications for paint reducing oil

The report submitted by the committee recommended the withdrawal of one tentative specification, revisions of five standard specifications, revisions of eight practice specifications and the adoption of two new recommended practice specifications.

Withdrawal of Specification

In 1921 the committee presented a new tentative specification for Chrome Molybdenum Alloy Steel Helical Springs. Inquiry has developed the fact that no use is being made of this specification except that one consumer had attempted to secure such springs with unsatisfactory results. The committee, therefore, recommends that this specification be withdrawn from the manual.

Revision of Standard Specifications

Specifications for Quenched and Tempered Carbon Steel Axles, Shafts and other Forgings, to be revised as shown. These specifications have been revised with the co-operation of the American Society of Steel Manufacturers' Committee on Axe Specifications to bring them into line with recent practice, mainly as regards form, and also to revise the section on proof tests. In the proposed modified form the two classes formerly called first class and second class according to size are changed to class A and class B. In the chemical composition the carbon content is increased slightly in class A. A change is made in the method of determining the elastic limit and the section relative to proof test has been amplified in accordance with the practice on the Pennsylvania System, New York Central Lines, Standard Steel Works Company and the Carnegie Steel Company.

Specifications for Quenched and Tempered Alloy Steel Axles, Shafts and other Forgings to be revised as shown. These specifications have been revised with the co-operation of the American Society of Steel Manufacturers' Committee on Axe Specifications to bring them into line with recent practice as regards form, and also to revise the section on proof tests. In the proposed revision the paragraph covering chemical composition has been changed to show an increase in carbon and manganese, the omission of a specification for silicon and the chromium content for chrome-nickel steel decreased. The method of determining the elastic limit has been clarified and new material added relative to proof test.

Specifications for Welded Pipe to be superseded by two new specifications; one covering Welded Wrought Iron Pipe and the other Welded and Seamless Steel Pipe. This revision is for the purpose of covering wrought iron and steel pipe in separate specifications and making these specifications agree with present standard practice. The proposed specifications are more complete than the old specifications on welded pipe.

Specifications for Boiler and Firebox Steel for Locomotive Equipment to be revised so as to agree with recent standard practice and specifications of other societies. The proposed revisions change the carbon content for firebox steel, provide for a modification of elongation for material over $\frac{3}{4}$ -in. in thickness by increases in $1/32$ -in. steps instead of by $1/16$ -in. steps and amplify the paragraph on marking.

Specifications for Rivet Steel and Rivets for Locomotive Tenders, Passenger and Freight Equipment Cars to be revised in agreement with standard practice as regards permissible variations in size in hot finished rivet bars.

Specifications for Carbon Steel Axles for Cars and Locomotive Tenders to be revised in order to provide additional tolerances where experience has shown such provision was necessary, and to cover certain changes in form in order to clarify the meaning. These revisions have been made in co-operation with the American Association of Steel Manufacturers' Committee on Axe Specifications. Allowable variations in turned diameters of smooth forged and rough turned axles have been increased. A change is also made in the section covering weights.

Specifications for Blooms, Billets and Slabs for Carbon Steel Forgings has the title changed to Carbon Steel Blooms, Billets

and Slabs and Forgings. Chemical specifications for carbon and manganese have been revised for the purpose of bringing the different classes of steel in agreement with what is now standard. Clauses on analyses and chipping have been revised and amplified to clarify the meaning.

Specifications for Annealed and Unannealed Carbon Steel Axles, Shafts and other Forgings to be revised in order to bring the specifications in line with recent practice. The changes have been made in co-operation with the American Association of Steel Manufacturers' Committee on Axe Specifications. Modifications have been made in chemical specifications for carbon and manganese. The maximum speed of testing machine when making tension tests has been increased and provision made for three instead of only one retest. A rewording has also been made of the paragraph on workmanship.

Specifications for Malleable Iron Castings to be revised in order to bring them into agreement with current standards. Revision increases the minimum allowances for tensile strength and for elongation. Provision is also made for retests when bars fail on account of flaws.

Specifications for White Lead for Lettering to be revised in order to bring the specifications into agreement with current practice. Under chemical composition where it is now specified that the mechanical moisture combined with pigment and oil shall be not over 0.25 per cent by weight, it is changed to read, not over 0.70 per cent by weight.

Specifications for Boiled Linseed Oil to be revised in section 7. Loss on Heating by changing temperature figures of 115 to 125 deg. C. to read 105 to 110 deg. C.

Specifications for Raw Linseed Oil to be revised the same way.

Specifications for Turpentine to be revised in the paragraphs covering appearance, color and odor, also revision in paragraph 6 on other properties.

New Recommended Practice Specifications

New specifications were submitted for Water Gage and Lubricator Glasses. These specifications cover three types of water gage glasses, namely, reflex, tubular and "bull's-eye," also "bull's-eye" type lubricator gage glasses. Specifications for physical properties and tests include optical test, dipping test, solubility test, pressure test and method of taking samples. Additional points cover permissible variations, workmanship and finish, wrapping and labeling, and inspection and rejection.

New specifications were submitted for Paint Reducing Oil used for mixing paste and semipaste to the proper consistency of painting. The reducing oil to consist of not less than 35 per cent of fixed oil and drier with the remainder mineral spirits. The fixed oil to contain at least 50 per cent linseed oil, the remainder being drying or semi-drying oils. Specifications cover also special requirements, drying tests, elasticity test, number of tests and inspection and rejection.

The report is signed by F. M. Waring (Chairman), engineer tests, Pennsylvania System; J. R. Onderdonk, engineer tests, Baltimore & Ohio; Frank Zeleny, engineer of tests, Chicago, Burlington & Quincy; A. H. Fetters, mechanical engineer, Union Pacific; H. G. Burnham, engineer of tests, Northern Pacific; J. C. Ramage, engineer of tests, Southern; J. H. Gibboney, chemist, Norfolk & Western; F. T. Quinlan, engineer of tests, New York, New Haven & Hartford; T. D. Sedwick, engineer of tests, Chicago, Rock Island & Pacific; G. N. Prentiss, engineer of tests, Chicago, Milwaukee & St. Paul; H. W. Faus, engineer of materials and equipment tests, New York Central; H. D. Browne, engineer of tests, Chicago & North Western.

Discussion

E. E. Chapman, (A. T. & S. F.): You are familiar with the advantages which accrue from the conscientious use of specifica-

tions as a check of service of material bought under the specifications. Take for instance firebox steel. With the increase in size of locomotive boilers and the introduction of superheaters, certain strains were placed in the firebox which did not have to be taken into account before this accessory was added to the locomotives.

For instance, during the firing up period, the bottom flues only of the boiler are used so that this introduces strains which tend to localize themselves in the top knuckle of the back flue sheet, due to blanking of the superheater flues by means of a damper. Also, in order to increase the flue mileage, it is the present practice of the majority of the roads of the United States to weld the tubes to the back flue sheet. These two items cause considerable distortion, concentrating in the top knuckle of the back flue sheet, so that it is necessary more than ever to have a firebox steel made to the best specifications available.

The change in chemical specifications for firebox steel, which the committee has made this year, calls for the elimination of the lower limit in carbon on firebox steel. This is believed to be a step in the right direction but it is believed that consideration should be given to the lowering of the maximum limit for the carbon content for plates $\frac{3}{4}$ in. or under in thickness not over 0.18 per cent and for plates over $\frac{3}{4}$ in. in thickness not over 0.25 per cent carbon. It is noted that the committee has recommended that the manganese in the thin plates have the upper limit reduced to 0.50 per cent in place of the present 0.60 per cent.

I wish to bring to your attention some firebox steel which we purchased in 1921 and used in our new Mikado type locomotives, as compared with steel which we secured in 1923 for the same type of locomotives. Both lots of these locomotives were manufactured at the same locomotive works and the steel was from the same mill. Between these two periods we found

no steel manufacturer who would supply a sulphur content under 0.025 per cent, which up to that time had been the Santa Fe specification. In 1921, the back flue sheets had a manganese content of 0.50 per cent with 0.021 per cent sulphur, while the back flue sheets on the locomotives received in 1923 had manganese, 0.38 per cent, with a somewhat higher amount of sulphur. The knuckles in the locomotives manufactured in 1921 lasted twice as long in the same general territory as those which were manufactured in 1923. With this in view I seriously question the reduction of manganese in firebox steel. In fact, the Santa Fe is seriously considering the increasing of the minimum manganese content in its firebox steel.

The use of manganese in moderate quantities, as you are aware, is for a cleanser of sulphur and phosphorus, and to secure a generally cleaner steel. Also, there is a greater resistance to the formation of cracks with the proper ratio of manganese. The steel rail manufacturers recognize this in rolling and take care to keep the ratio of sulphur to manganese very high. In the steel which is constantly subjected to high temperature and stresses it is believed that it is not wise to reduce the manganese content.

In the specifications for malleable iron castings, the A. R. A. have gone on record for the use of a yield point in steel castings and the elimination the ultimate strength for acceptance, using it for information only. Would it not be well to institute a yield point in the specifications for malleable iron castings? In fact, at present the Association of Malleable Iron Manufacturers is willing to use the same yield point as is called for in the A. R. A. specifications for steel castings under Grade A, which would be 30,000 lbs. per sq. in.

On motion, the report was accepted and referred to letter ballot of the division.

Report on Safety Appliances

Mr. Chambers: The committee has no written report this year. The principal work we have been engaged in is the arrangement for testing out the air brakes to comply with the Commission's requests in power brake appliance hearings. H. A. Johnson, our director of research, has a statement to make.

H. A. Johnson: The Director of Research was appointed in the early part of December, 1924, and instructed by the Committee on Safety Appliances of the Mechanical Division to proceed upon the following plan:

1—Steps will be taken to obtain appliances, which, it is claimed, meet the views of the Interstate Commerce Commission, as indicated in its preliminary report and conclusions. If the plans or specifications for such appliances are available and the appliances are not yet being manufactured, steps will be taken by the Director of Research to secure such appliances, even to the extent of entering into an agreement to have such appliances made.

2—As soon as such appliances have been obtained they will be given exhaustive tests on the test rack at Purdue University, which rack will be completely prepared and brought up to date for the purpose of this investigation.

3—Following the completion of the rack tests such devices will be given road tests, to develop whether or not they meet road conditions safely in service.

4—This program will be carried out with all dispatch and as promptly as the devices for these tests are available.

5—The investigation will also embrace such further study as may in the judgment of the Director of Research throw further light upon this problem.

In response to inquiries sent to the Westinghouse Air Brake Company, the Automatic Straight Air Brake Company, and the New York Air Brake Company, the American Railway Association has purchased from each of the first two named companies 150 sets of freight air brake equipments, which, it is claimed, meet the views of the Interstate Commerce Commission as indicated in its preliminary report and conclusions. Both companies are now manufacturing these equipments.

A contract between the American Railway Association and the Purdue University Engineering Experiment Station has been entered into covering the use of the facilities of the University during the rack tests, which will be made upon the American Railway Association test rack. The test rack has been redesigned and is now being rebuilt to represent two Type ET locomotive equipments and 100 modern freight car equipments. The test rack is being arranged to accommodate the several types of equipment

which will be submitted for test and this necessitates lengthening the rack 25 per cent. An order has been placed with the Westinghouse Air Brake Company covering the two Type ET locomotive equipments and the necessary material for placing the rack in first-class condition. Practically all of this material is now at the University or has been shipped. The length of brake pipe per car is being increased from 42 ft., center to center of hose couplings, to 50 ft., center to center of hose couplings, which more nearly represents average present day conditions.

In the conduct of these tests automatic recording instruments will be used, wherever possible, to eliminate the human element in reading and recording results. As there were no instruments on the market suitable for this work, it has been necessary to design and develop new instruments. These instruments are now being manufactured.

The drafting of a schedule of tests, to which the various equipments will be subjected, is well under way. This schedule will include the American Railway Association code of tests and such additional tests as are necessary to develop the additional functions provided for in the preliminary report and conclusions of the Interstate Commerce Commission. Upon completion the schedule of tests will be submitted to the Bureau of Safety of the Interstate Commerce Commission, the manufacturers submitting equipment and the Committee on Brakes and Brake Equipment of the American Railway Association, for their criticism and suggestions. It is to be understood that the schedule of tests may be modified or revised as the tests progress, if such modification appears desirable in the opinion of the Director of Research. The present standard Type K freight equipment will be tested first in order to establish a proper basis for comparative results. The Type K triple valves, which have been installed on the test rack for a number of years, will be replaced by the Westinghouse Company with new Type K triple valves.

It is expected that the rack tests will be started during the early part of September and be completed by the end of the year. The men who will act as official observers during the tests will be selected largely from the staff of professors and instructors of Purdue University who are skilled in carrying on scientific researches and who will be unbiased in their judgment. All work performed by the University staff will be under the direction of

the Director of Research, who will be responsible for the conduct of the tests and the results obtained just the same as if the observers were on his own payroll. The Bureau of Safety of the Interstate Commerce Commission, the manufacturers submitting the equipment, and the American Railway Association will be invited to have representatives present during the tests.

No definite plans have yet been made in connection with carrying on road tests, as the nature of the road tests will depend somewhat upon the results obtained on the test rack. Road tests will probably not be undertaken before next spring or summer as the rack tests will not be completed before winter sets in.

The Director of Research is making semi-monthly reports of

the progress of the investigation to W. P. Borland, Director, Bureau of Safety, Interstate Commerce Commission with copies to R. H. Aishton, President, American Railway Association, C. E. Chambers, Chairman, Committee on Safety Appliances and V. R. Hawthorne, Secretary, Mechanical Division. In this manner the Bureau of Safety and the officers of your Association are kept thoroughly informed of every move made and are given the opportunity of making suggestions as the work progresses.

As many of you as possible should visit the University sometime during the conduct of the tests, or have your air brake man drop in for a few days to see how the work is going on. I would be very glad to have you come and have your suggestions.

Report of Committee on Wheels

New cast iron wheel specifications generally approved—Grinding—Manual of wheel shop practice offered for criticism

The new cast iron wheel specifications adopted in 1923 are now in general use and appear to be meeting with approval both from the users and the manufacturers. It has been found in practice that the extra requirements in these specifications, as compared with the old, have not caused the manufacturing difficulties which were anticipated by some makers. There is no question but what these specifications are proving a help in getting better wheels.

During the year your committee has discussed the question of still further increasing the requirements of the specifications, particularly as regards thermal test, in an effort to get further protection against cracked plate wheels. A considerable number of experiments must be made before any such recommendation could be presented by the committee, and it is planned to go into this question during the coming year as well as to hold conferences with the manufacturers in regard to same. Consideration will also be given to the inclusion in the specifications of a prescribed method of chemical analysis.

Developments in Cast Iron Wheel Design

During the year your committee has been watching the developments in the design of cast iron wheels. They witnessed the making of wheels with a lip chill at one foundry and examined some which had been in service for a number of years, in order to get an idea as to the relative merits of these lip chill wheels and the sand rim type. Wheels of both types were broken under the drop and examined to determine the nature of the metal at the rim. The committee came to the conclusion that the lip chill wheel is less liable to chipping of rim, and that a saving may be accomplished by its use since there are a very large number of wheels removed from service because of chipped rims.

The most interesting development in cast iron wheels is the single plate design. Tests which are being made of the 850-lb. single plate wheels in engine tender service have not progressed sufficiently to warrant the committee making any report on them. Up to the present time we know of no single plate wheels of lesser weight which have been put to service, but we anticipate that some such wheels will be produced and are hopeful that they will prove a help in the reduction of cracked plate wheels, particularly in high speed freight service, such as in refrigerator cars. There has undoubtedly been a radical improvement in the cracked plate wheel situation since the adoption of the heavier arch plate designs. However, cracked plates are still a problem and your committee hopes to co-operate with the manufacturers in an effort to still further improve the designs of the wheels.

Grinding of Cast Iron and Steel Wheels

Your committee made a series of tests on a wheel grinding machine in the shops of one of the member railroads. The grinding machine is built by the Norton Company, Worcester, Mass. The machine is motor connected by chain drive to a shaft which in turn is connected to the grinding wheels and drive for wheels in lathe by flexible leather belts. The grinding wheels cost \$27.52 each and average about 200 slid flat cast iron wheels

before they are replaced by new grinding wheels. The machine is operated by one man employed at a rate of 62 cents an hour.

Grinding cast iron wheels removed from service on account of slid flat spots, the lathe will average two pairs of wheels per hour or 16 pairs per eight hour turn. Grinding steel wheels removed on account of slid flat spots, the average output would be somewhat greater as the time required per pair of steel wheels is less than per pair of cast iron wheels. Grinding new cast iron wheels to insure rotundity, the output is four pairs per hour or 32 pairs of wheels per day average.

The second pair of new wheels applied in the lathe were cast by the Griffin Wheel Company for refrigerator car service, 700 lb. wheels, September 15 and September 26, 1924, tape 3, A. R. A. 1917. Application of a gage prior to the grinding operation indicated lack of rotundity of about 1/32 in. During the grinding, this out of round condition became apparent as soon as the grinding wheel was applied to the wheel tread and wheels were revolved in the lathe. It should be noted that unless a gage is used, a considerable number of new cast iron wheels would be swung into the grinding machine needlessly. Considerable labor and time can be saved by the use of a rotundity gage applied to the journal with contact point in the center of the wheel tread, the wheels to be rolled on the track and contact of gage point with tread noted.

Grinding Slid Flat Rolled Steel Wheels

A pair of slid flat rolled steel wheels with good flanges were selected for test and one wheel of the pair was ground to correct the slid flat spots, the mate wheel later being turned in a wheel turning lathe. On the first wheel, one slid flat spot was 3 in. in length and two additional spots totaled 4 in. in length. The grinding operation resulted in a loss in wheel diameter of 1/16 in., a reduction in tape size from 262 to 260 $\frac{1}{2}$ or a loss in service metal of 1/32 in. The mate wheel, with a slid flat spot 3 $\frac{1}{4}$ in. in length, was placed in a turning lathe for turning in accordance with ordinary practice. The saving in service metal for the pair of wheels if ground instead of turned would amount to 3/16 in. service metal per wheel at \$2.03 or 6/16 in. for the pair of wheels, which represents a total saving in value of service metal of \$12.18. It should be noted further that the labor for the grinding operation was less than one-quarter hour at 63 cents per hour for grinding as compared to a labor item of three-quarters hour at 75 cents per hour for turning operation.

One of the principal objections which has been raised against the practice of grinding slid flat wheels has been based on the fear that a ground wheel would develop a comby spot at the same location as the original flat spot due to thermal cracks. The best answer to this contention is the experience of those roads which have been following this practice for many years. This shows that these comby spots do not develop. In fact the records show that some wheels have been ground three times. It is important however that the wheels to be ground be carefully selected and only those in good condition except for the flat spot be ground. No shelled, comby or badly tread worn or flange worn wheels should be considered.

It is estimated that a grinding machine, completely installed, will cost \$10,000. It is interesting to note that it has been the experience of one road that a large percentage of the cast iron wheels removed on account of slid flat spots were new wheels. This is probably due to the tendency of out of round wheels to be bound in the trucks by the brake shoe application resulting in slid flat spots in cast iron wheels. It follows naturally that when new wheels are placed in the machine and ground after mounting, the number of wheels removed on account of slid flat spots would be reduced to a considerable extent and that further the loss incident to scrapping of new cast iron wheels removed from service on account of slid flat spots is greater than appears to be the case when considering the difference in value between new cast iron wheels and second hand cast iron wheels than scrap cast iron wheels under A. R. A. Rules of Interchange. For instance, the A. R. A. price quoted for 750-lb. cast iron wheels new is \$17.40; second hand value \$9.55; and scrap \$6.30. To reclaim the wheels as second hand rather than scrap results in a saving of \$3.25 per wheel or \$6.50 per pair, but this does not represent the actual saving for wheels reclaimed after removal from service on account of slid flat spots on comparatively new wheels. Furthermore, these wheels are better than the average second hand wheel since wheels with badly worn flanges, brake burns, etc., are not ground. To the actual saving of \$6.50 in value of the wheels should be added the saving represented by cost of dismounting, remounting, boring, etc.

Cost of Grinding Slid Flat Cast Iron Wheels

Labor $\frac{1}{2}$ hour at 62 cents.....	31 cents per pair
Interest and depreciation at 10 per cent, \$10,000 first cost (1924 price), 3,000 pairs ground per year.....	33 cents per pair
Power 12 k.w.h. at $1\frac{1}{2}$ cents.....	18 cents per pair
Grinding wheels at \$55 per pair.....	37 cents per pair
150 pairs wheels ground per pair grinding wheels.....	\$1.19 per pair
Saving per pair based on second-hand values.....	\$5.31
Saving per pair based on new values.....	\$21.01

Gage for Re-Mounting Wheels

There has been considerable controversy in regard to the use of the cast iron wheel re-mounting gage shown on pages 45 and 46 of Section B of the Manual. It appears that these gages have been used improperly by some railroads and such use has resulted in the wastage of serviceable material. This gage provides for a satisfactory and definite way of classifying second hand cast iron wheels as between scrap and second hand for billing purposes. It was never intended for steel wheels, though some of the roads have been using it in their shops for this purpose. In order to clarify this matter, the committee recommends that the title for this gage be changed to read: "Limit Gages for A. R. A. Billing Classification of Second Hand Cast Iron Wheels." (The committee felt that there was no need for both of the remounting gages shown on page 45 (Section B) of the Manual and recommended that the second figure on this page be eliminated and the title under the first changed so that it will refer to all cast iron wheels. Since the maximum wear limit on flanges is $1\frac{7}{16}$ in., it was also felt that $1\frac{5}{16}$ in. is a fairer limit than $1\frac{3}{16}$ in. The committee report also included an explanation of Interchange Rule 24, and some important recommendations regarding the mounting of wheels, the use of pressure gages for wheel presses and mating of steel wheels.—Editor.)

Questionnaire on Steel Wheel Wear and Contour

In accordance with the committee's 1924 report, a questionnaire was sent to all railroads to gather information as to their practice regarding tread wear of steel wheels and also as to the desirability of using a standard contour for driving tires and all other wheels, particularly to determine if a 1 in. flange height for driving tires would be satisfactory. This questionnaire developed the fact that there was a great difference of opinion on these questions. The vote was approximately evenly divided for and against the 1 in. flange on drivers, though the majority stated that it would be advantageous from a shop viewpoint. Your committee is of the opinion that the 1 in. flange, which incidentally is being used by a number of roads and is used on engine truck wheels, should be standardized. However, in view of the large number of roads opposing such practice, your committee will not make such recommendation at the present time, but will continue its observation of results secured by those roads who are using this type of flange on driving tires.

Steel Wheel Specifications

During the past year your committee has given a large portion of its time to the consideration of wrought steel wheel manufacturing processes. A sub-committee has visited the plants of most of the manufacturers and studied the various processes used. We have also held a conference with the representatives of the different manufacturers and upon our request they have formed a technical committee to work with your committee in the development of the wrought steel wheel. A suggestion was made that the specifications be changed to include a number of new requirements regarding process of manufacture. After a conference with the manufacturers, your committee decided that a better procedure would be to work out the various problems involved through the technical committee and leave the specifications as they are, at least, for another year, pending the results of these further studies. The service to which steel wheels are being put is becoming more and more exacting, particularly in locomotive tenders, and improved processes are necessary to fully meet these requirements. We are glad to report that the manufacturers, by the formation of this Technical Committee, are showing a spirit of co-operation in working toward a solution of these difficulties and we are very hopeful that the next year will produce changes and improvements which will prove most helpful to the users of wrought steel wheels.

Your committee has found that there are very few 38 in. wrought steel wheels now in service and they therefore recommend that such wheels be removed from the standards of the Association.

Limits of Wear on Rolled Steel Wheels

At the last meeting the committee recommendation to reduce the limit of wear for rolled steel wheels in switch engine tender service was approved. The matter was referred to Mr. Pack of the Interstate Commerce Commission and he has issued a ruling permitting this lower wear limit under the I. C. C. Inspection Rules. The railroads are therefore able to take advantage of this further saving of wheels.

The committee was requested to consider reducing the limit of wear on all tender wheels and also on all passenger wheels. Though all the reports indicate that no trouble is being experienced with the lower wear limit in freight cars, your committee does not feel that sufficient experience has been had with these lower limits to warrant their making such recommendation at this time. We wish to protect passenger car and engine service in every possible way and it should be remembered that passenger car wheels worn to 1 in. need not be thrown away as they can then be transferred to freight service. All of the roads are not taking advantage of this possible extra service of wheels, and the committee urges that they give it consideration.

The rolled steel wheel is not permitted to be worn under passenger cars or under tenders of road engines to less than 1 in. rim thickness. It is probable that this amount of dead or unused metal is more than safety requires. This limit was established in the days when steel wheels were mostly steel-tired with an independent center. This type of wheel did not have the strength in the rim which is possessed by the single plate rolled steel wheel of today. It seems reasonable that the rim of the more modern rolled steel wheel can be worn to a thinner section than can the rim of the steel tired or assembled wheel. If this is correct, the present standard of 1 in. thickness at which rolled steel wheels are condemned from passenger service and road engine tenders, wastes some metal in each wheel.

In order that the railways may be supplied with the best information available as to what is safe and advisable in this matter, it is recommended that a questionnaire be sent each railway for its filling out with the results of its experience and its views. This questionnaire is to be worded so clearly that it cannot be misunderstood, and to develop data which can be compiled on a common basis for conclusions.

Manual of Wheel Shop Practice

In accordance with statement made in our 1924 report, we have prepared a manual of wheel shop practice. The committee has devoted a large amount of time to the preparation of this book and we are presenting it for your consideration at this time with the understanding that it is not a fully finished piece of work. The section covering classification and causes of defects is particularly useful of further study and development. The committee believes that thru co-operation with the technical committee of the wrought steel wheel manufacturers during the coming year

more conclusive information will be developed. Undoubtedly, there will be found many features which can be improved upon and the committee presents it with the request that during the coming year the members furnish criticisms and suggestions for changes and it is hoped by the end of another year the committee can revise the Manual so as to put it in finished shape for issuance to those interested.

(The committee here inserted a copy of the proposed manual of wheel shop practice, which is profusely illustrated and contains 20 main subdivisions of this important work. It forms a 100-page booklet.—Editor.)

The report was signed by C. T. Ripley, chairman, chief mechanical engineer, A. T. & S. F.; O. C. Cromwell, assistant to chief of motive power and equipment, B. & O.; H. E. Brownell, general foreman foundry, C. M. & St. P.; G. B. Koch, general foreman foundry, Penna.; H. W. Coddington, engineer tests, N. & W.; A. Knapp, inspection engineer, N. Y. C.

Discussion

Mr. Ripley: I wish to acknowledge the assistance of one member of the committee whose name does not appear in this report and that is Mr. North of the Pullman Company.

The Committee withdraws the recommendation that the title of the remounting wheel gage be changed. It appears that this will cause certain controversy in interchange rules and it wishes to give further consideration to that. It is suggested that you all check up the use of this gage and avoid the wheel foreman scrapping wheels which should not be scrapped.

The last subject referred to in the report is that of the Manual of Wheel Shop Practice. Your committee was somewhat reluctant to undertake this work as it is a rather new departure in A. R. A. committee work. However, we have had numerous requests for information regarding wheel matters, gaging, etc., and it is our sincere conviction that it is fundamentally correct to get all the knowledge you can directly to the man who is doing the work. The Manual is a small effort in that direction.

Chairman Tatum: A prepared discussion by O. S. Jackson (Union Pacific) will be read by Mr. Fetters.

Mr. Fetters: I think it is fitting that this 1925 convention should close with such an excellent report as the Wheel Committee has just delivered to us.

The report of the committee and especially that part covering the Manual of Wheel Shop Practices will fill a long felt want and be the means of reducing any important section of the maintenance of equipment to a uniform standard practice in each railroad shop.

The section on grinding slid flat wheels is exceptionally good and especially interesting to us at the present time inasmuch as we have recently installed a Norton wheel grinding machine to do this work, but to date we have not secured any definite data on its operation.

The question of a proper limit of wear for rolled steel wheels under switch engine tenders has been disposed of satisfactorily and the new limit will save many dollars.

One of the most perplexing and annoying problems coming to our attention has been the large proportion of rolled steel wheels removed from heavy road tenders on account of being shelled out. While admitting the heavy loads imposed, it seems that the material is not what it should be and I think offers an opportunity for investigation by the Wheel Committee during the coming year.

A. E. Calkins (N. Y. C.): With a few minor exceptions the 1923 cast iron wheel specifications were incorporated in the New York Central specifications as of January 1, 1925, and present indications show that excellent results may be anticipated from these wheels.

We are interested in the development of the so-called lip chilled wheel. There are more wheels continued in service with chipped rims just outside of the gage limit than we as mechanical department men care to disclose, to say nothing of those condemned annually for this defect.

We will await with interest further data on the 850 lb. single-plate cast iron wheels. Likewise we are watching the development of devices for grinding cast iron and wrought steel wheels, but the New York Central has never resorted to this practice, nor to the welding of slid flat spots.

We have never believed that the remount gages shown in the manual should have been used for remounting determinations.

Our experience teaches us that the flange thickness requirement of these gages is too severe and if recognized would result in an alarming economic loss. Measured on the base line of the thread, this remount gage requires the scrapping of a cast iron wheel under an 80,000 lb. capacity car when flange thickness is 1-3/16 in. whereas the standard wheel condemning gage allows the continuation of the wheel in service until the flange is worn down at the same point to 1 in. Even though the continuance of the gages is desirable from an interchange billing standpoint we believe every road should remount such wheels for use under their own equipment in order to conserve the investment not yet realized. It is believed that local gages fixing a 1-1/16 in. flange thickness measurement at the base line of the tread and 1-1/4 in. flange height could be utilized to this end. Otherwise 80 per cent of all wheels removed from any cause will find their way to the scrap pile.

We intend to try out the wheel and axle centering gage. We have always required central mounting of the wheels on the axle to guard against premature flange wear, but it is quite apparent that the proposed gage is superior to our existing method of measuring. However, it presupposes the minimum inside spacing of 4 feet 5 3/32 inches at all times whereas the allowable maximum is 4 feet 5 1/2 inches, or a 13/32 in. spread.

The suggestion that a more general use of hydrauligraphs might be attained through a provision in the Interchange Rules, is not concurred in. We insist on the general use of the autographic types and require press operators to show the axle size as well as the wheel number in order to carry out our scheme of checking wheel mounting data in general offices in addition to the surprise checks made during the day. If some of the member roads see fit to bar their use, the suggested change in the interchange rules would not quicken them. Nor would it be any consolation to the road sustaining an \$80,000 wreck because of a loose wheel on a foreign car resulting from inaccurate mounting pressures, to have the proposed provision inserted.

The New York Central has always allowed the tolerance prescribed in the manual between the bore of the wheel and the diameter of the axle seat of 0.001 in. per in. diameter of the wheel seat. Our hydrauligraph shows that such practice results in wheels being mounted at most satisfactory pressures within the limits when this tolerance is allowed.

The manual sets up a desirable minimum thicknesses for hub walls of wrought steel wheels. We intend to check our practice at each shop to see if these 1-1/4 in. and 1-1/2 in. dimensions are observed, as we are not familiar with this shop detail at the present time.

We have been told that some roads visited by the Sub-Price Committee do not re-finish the journals of dismounted axles which means that such axles are not even run through lathes to determine if they are bent. A little carelessness in use of the spacer gage would result in wheels being mounted on bent axles and placed in service.

We trust that during the coming year the Wheel Committee will investigate and incorporate in the manual some further data, and perhaps drawings of fillet gages for various journals which will tend to increase the life of our axles. Previously we could find second hand usable axles for the great majority of our freight wheels used for maintenance. Now, in spite of our up-setting practice, we are buying too many new axles for freight maintenance on account of scrapping so many dismounted axles due to excessive journal seat length. In the last analysis, it is up to our axle lathe operators.

We suggest that the committee include in this manual a provision to the effect that wheel shops should stencil on each end of the axle inside of the wheel seat, the actual diameter of each wheel seat. This proves of great value to billing clerks at shops where wheels are applied, as it is not possible to caliper correctly all axle wheel seats after the wheels are mounted and when they erroneously reach a measurement higher than the actual, the repairing road suffers a loss of about \$14.30 per pair of new wheels under interpretation 9 of Rule 98.

In going through this report, I note it specifies "No grinding of journals by carborundum wheel, or polishing by emery under pressure should ever be done."

We have been doing that on the New York Central with very good results. Of course, if it is not done in a proper manner it may be detrimental in connection with the elimination of hot boxes, but we believe that this feature should be more thoroughly investigated before it is put down as an arbitrary ruling.

G. S. Goodwin (C. R. I. & P.): One of the features of the report is the attention given to slid-flat wheels. The report points out that it is possible to grind these wheels and return them to service at a very nominal cost. While the report properly emphasizes that in grinding these wheels they should be ground so as to be truly concentric when turned out, there is a possibility that a less amount of grinding may give good results. For the past month we have tried out, with pronounced success, a new portable wheel grinder, reclaiming slid-flat wheels by grinding off the high spots on a 14-in. arc on the wheel circumference. During the first few days of its operation a record was maintained as to its performance, and, on 12 pairs of wheels ground, we found that it required a total of 251 minutes, average 21 minutes per pair, at a cost of 40 cents, which did not include electrical current or shop pro-rata; this, too, with men who were unfamiliar with the machine. The flats varied between $2\frac{1}{2}$ in. and 3 in. The metal removed ranged from $3/64$ in. to $1/16$ in. The grinding was dry and wheels or chill showed no signs of heating. All of the wheels that we have ground, approximating 30 pairs to date, have been restored to service on our own equipment. Up to the present time we have discovered no reasons why we should not continue treating slid-flat wheels in this manner.

It may be interesting to know that we have in service three pairs of these ground wheels in our suburban service at the

present time, and which we have been observing for more than a week. In one instance a pair of wheels had adjoining flat spots of 3 in. and $2\frac{1}{2}$ in., with another flat about 30 deg. away of $2\frac{1}{2}$ in.; all three of these flats were removed from one wheel in 20 minutes. The arc described was 20 in. and the metal removed from the peak part of the adjoining spots was $1/8$ in., while from the other spot $3/64$ in. was removed. We appreciate that such a wheel has no place under a car, but wished to see what the results would be with such an extreme case. In riding, the coach containing this particular pair of wheels, we have noticed little vibration in the body of the car, nor has the brake shoe shown any tendency to stick; with the other wheels, absolutely no indication of eccentricity could be observed in the car; in other words, the performance of these ground wheels appears to be normal, and the result of this test up to the present time leads us to the conclusion that this particular form of treatment is entirely satisfactory. As previously stated, the portability and weight of the device permits of its ready movement on the rip tracks where electric power is available.

We propose to confine the use of the ground wheels to our own equipment which remains on our line. In the event that the grinding of wheels becomes general, the American Railway Association will no doubt establish prices for this work so that they may be applied on foreign cars.

The report was accepted and referred to letter ballot.

Closing Business of the Meeting

Announcement of election — Past chairman's badge presented to Mr. Tatum by Mr. Brazier

Secretary Hawthorne: In accordance with the action taken that the rules of order be suspended and the Secretary cast the ballot of the convention for officers and members of the General Committee as recommended by the Committee on Nominations and that the Committee on Nominations be continued as at present, I wish to announce that the following have been elected as officers and members of the General Committee:

The secretary here read the list of officers recommended by the nominating committee and published elsewhere in this report.

Chairman Tatum: You have heard the result of the ballot as cast and you now know your officers for the ensuing year. The chairman selected not being present and being out of the country, I take pleasure in introducing to you your vice-chairman, Mr. Sillcox.

Mr. Sillcox: Our duty for the future is to make this Association what it ought to be continually, and I am sure that if Mr. Wallis were here he would ask each member to do his part even better than before.

This Association can reach any goal which each individual member will endeavor to make it attain. It is our united effort, our united experience and our wholehearted cooperation in these conventions that will advance, it seems to me, the mechanical department efforts in this country. I am sure none of us is leaving this convention this year without having received great benefit, without having resolved to do his part on each road we serve.

Mr. Brazier: There is no need for me to go into detail regarding what this Association has done in the past. It stands today as the leading mechanical legislative association in the world. We must continue this Association with all its activities. We should have our regular annual conventions. Papers should be gotten out well in advance so that the members will be posted regarding them at the time of convention. There are many other railroad organizations that continue to hold strong and vigorous annual conventions and this, the mother of them all, should be a leader and not a follower. I speak of this as there seems to be a feeling that we are sliding backward as an Association. We are looked upon the world over as authority on mechanical, as well as interchange matters and after the splendid record we have made let us, as long as we are able with our influence, see to it that our future slogan will be, "continuation of our annual conventions, our educational ex-

hibits and everything that pertains to the welfare of this Association."

It is an honor to be selected as Chairman of this Association with all its past history and I think I can express the sentiments of all the members here today when I say that our retiring chairman, J. J. Tatum, has filled the position of Chairman with honor and credit to himself and the Association. We know not what the future may have in store for us, as an Association, but we do know that the work it has accomplished will stand forever.

It has been a pleasure for me to have been associated with you for 25 years more or less in the work of our Association and I feel quite honored to have the privilege of presenting this past Chairman's badge to you from the officers and members of the American Railway Association, Mechanical Division. (*Mr. Brazier here pinned the past-chairman's badge on Mr. Tatum.*)

Mr. Tatum: I wish to thank every member of this Association and those who attended it for the help they have given in carrying on the work assigned to me by the Association. The various committees have worked hard. They have presented to you their papers, their reports of their work and they have been excellent. However, it has been sad to me to sit at this table and see these papers passed over one after another without all of them receiving the attention in the way of discussion due each paper. Mr. Brazier made mention of the reports being sent in at an early period so they could be studied. I wish to remark in connection with that statement that it does not matter very much if those reports are sent in early if only a short limit of time is given to discuss them. We have attempted to do here in three days, work that should have taken twice as long and I would urge that those in charge of the Association, the railroads represented by the Association, consider this matter seriously, and that due time be given by the representatives sent here to give the reports a fair and thorough consideration.

Vice-Chairman Sillcox: We are going to meet in Atlantic City, I believe, next year. There will be as good an exhibit as there was last year, and when you consider the effort and the money it takes to put forth these educational efforts they can reach any limit of helpfulness that we will make them. Let us try with all the experience behind us to make next year's convention all that you want it to be, all that it can be if we do our utmost to make it so.

(The meeting then adjourned sine die.)

General News Department

The Interstate Commerce Commission has denied a petition of the Baltimore & Ohio for a further extension of the time specified for the fulfilment of its automatic train control order of June 13, 1922.

Nickel Plate Unification Hearing

The hearing on the Nickel Plate unification application was again interrupted, shortly after cross-examination of O. P. Van Sweringen was resumed on June 18, by a controversy which arose from objections made by his counsel, former Secretary of War Newton D. Baker, to a line of questions propounded by counsel for the Chesapeake & Ohio minority stockholders as to the financial affairs of real estate and other companies in which the Van Sweringen brothers were interested before their purchase of the stock of the New York, Chicago & St. Louis. Commissioner Meyer, after a delay for consultation with other members of the commission, said he had been authorized to direct that the questions be answered, but Mr. Baker asked for an opportunity to argue the question before the full commission, saying the matters involved were entirely outside the scope of the proceeding, and it was arranged that Wednesday, June 24, should be set aside for that purpose.

Mr. Van Sweringen had testified that he was not able to produce papers asked for by H. W. Anderson, counsel for the protesting stockholders, including memoranda, data and correspondence bearing on the formulation of the Van Sweringen proposal, but was given some details asked for regarding the Nickel Plate Securities Corporation, formed to hold the stock of the New York, Chicago & St. Louis which the Van Sweringens had purchased on credit and the sale of preferred stock of which provided the \$2,000,000 to make the first payment on the stock. He said that in addition to \$520,000 paid by himself and brother for preferred stock of this company they had also contributed to it \$5,100,000 of the common stock of the Terminal Properties Company and that \$500,000 of the preferred stock of that company had been pledged as collateral for a temporary bank loan of the \$2,000,000. Mr. Baker's objection came when Mr. Anderson asked how much other stock of the Terminal Properties Company there was and who owned it, saying he desired to go very fully into the affairs of that company, as well as into those of the Cleveland & Youngstown Railway, an interurban line into Cleveland promoted by the Van Sweringens.

Mr. Baker, who had not appeared in the case until Mr. Van Sweringen's appearance as a witness, said he had read the previous record in the case with "perfect amazement," in view of the fact that the questions involved are whether the unification proposed is in the public interest and whether the proposed terms are fair, with the understanding that if the commission does not consider them so it will impose such conditions as to make them fair. He said the Van Sweringens are willing to disclose every detail concerning any of the railroad financial transactions, including the lists of stockholders or other persons in interest in the Nickel Plate Securities Corporation and the Vaness Corporation, although they are private companies, and that they desire to discredit the rumor that the New York Central or any other railroad had any interest in the transactions, but that questions going back of that were outside the scope of the proceeding and would cumber a record already enormous. He said if they were allowed there would not only be no unifications of railroads, but the hearing would never end, and that they involve the affairs of people who have no interest in this proceeding.

Mr. Anderson replied that Mr. Van Sweringen had himself first brought up the New York Central rumor and that made it necessary for him to inquire thoroughly into it. He was not willing to accept Mr. Van Sweringen's conclusion that the list of stockholders and their relations would not disclose any New York Central or other railroad interest, he said, but he proposed to inquire into every phase of the various Van Sweringen transactions and the connections, financial and other, through which

railroad system was built up, because the New York Central might not have direct control but still might control through relations with financial institutions. He said the Terminal Properties Company controls the "air rights" in connection with the Cleveland Union Terminals Company, and that the Chesapeake & Ohio stockholders are interested because of the Nickel Plate's assumption of obligation in connection with that company.

Mr. Baker replied that there was no objection to any inquiry as to any railroad affairs, but to improper extension of cross-examination into private affairs and the effort to create a "mob atmosphere" and to get suggestions and insinuations into the record and into the newspapers. Commissioner Meyer asked if the hearing could not proceed until he could consult with his colleagues, but Mr. Anderson said that his other questions were along the same lines, and it was decided that it was necessary to settle the issue. After the lunch hour Commissioner Meyer said he had been authorized to direct the witness to answer, whereupon Mr. Baker renewed his objection and asked for a decision by the full commission after argument. There was some discussion as to the exact question to be put up to the commission, during which Mr. Anderson said that he did not want to state just what he expected to prove from the facts he expected to elicit from Mr. Van Sweringen, but that he would state that the potential value of the interests acquired by the Van Sweringens in the Cleveland terminals would amount to many millions more than they had put in, and that he expected to show that the profits from the real estate transactions and the unification of the railroads would run to as high as \$100,000,000 in a few years. He said there was no object in his continuing the cross-examination along other lines, and that the inquiry would be futile unless he was allowed to ask the questions he desired. It was then agreed that after some additional testimony by T. C. Powell, vice-president of the Erie Railroad, the taking of testimony should be adjourned until June 25.

Canadian Senate Considers Railway Problems

Canada's railway situation is receiving some close attention at the hands of the Canadian Senate. For three weeks past a special committee of that chamber has been examining railway experts on the question of how to relieve the nation of the heavy railway expenditure, the witnesses so far being Edward W. Beatty, president of the Canadian Pacific; Sir Henry Thornton, president of the Canadian National; Sir Joseph Flavelle, who was president of the Grand Trunk board after that road was taken over by the government and before it was consolidated into the Canadian National; and D. B. Hanna, head of the Canadian Northern Board before that road was taken into the amalgamation. A report by the special committee will be made to the Senate in a few days.

At least two members of the Senate last week in debate dealt with the railway situation in a general way. Senator J. A. McDonald, of New Brunswick, after pointing out that high taxation in Canada was frightening away investors, and that that high taxation was largely attributable to too much railway building, said:

"The man who knows that in the last five years this country of nine millions of people, with a national debt of two and a half billions of dollars, has further invested by cash advances, capital, and bond issues, the enormous sum of \$585,848,974 in our national railway, not including interest—I say that the man who realizes that fact and passes it over with merely a gesture of optimism, is not a citizen friend, but a citizen fool."

"I am not a railway man, but there have been instances of the inexpert showing the way to the specialist, of the novice giving the experienced man the very suggestions he has needed. In this spirit, honorable gentlemen, I humbly suggest a method which I think merits the consideration of my honorable friends present, the government of the day, especially the minister directing the Department of Railways, and the experienced executives at present directing our railways, as well as the people from one end of the

country to the other, who may not give their attention without benefit.

"I believe that second only to our present condition of over-expansion in railways, our greatest mistake is over-centralization of these nationally-owned railroads.

"I have the greatest respect for the chairman of our National railways. I acknowledge him to be a great railway man, and, further, I have a regard for the capacity of some of his assistants; but these men are not super-men. They are naturally inclined to build up an organization that will lighten their own tasks. They will be inclined to make rules and define regulations that their subordinates in distant sections of the country dare not deviate from.

"Now, I have said that centralized authority tends to oversystematizing an organization, which precludes the possibility of giving to each part its proper measure of understanding and the sympathetic treatment of its needs. Ontario and Quebec have their own problems, but these should not be solved to the neglect of matters of moment and concern to other provinces. The Maritimes have their problems, the Middle West theirs, and the Far West theirs also—all of a different nature, but of equal importance in the building up and progress of our Dominion.

"The Maritime Provinces have always protested against the absorption of the old Intercolonial in the National system. They have more than purely economic reasons for their protests; but these political reasons are well known to you and to the people of the country as a whole; I will not stress them here. I would propose that we revert to the old order of things and place again the Atlantic division of the present great system in the hands of men who know the local condition and local requirements. I would do the same thing for the Provinces of Quebec and Ontario and the western sections of the country, as the interest of each may be determined by its geography.

"I would place in charge of each division or district a manager directly responsible to the Minister of Railways at Ottawa. It may be said that this would be centralizing authority over again, but this need not be so. Each manager would have the same power that is now placed in the hands of one active operating head, and should have the sole right to appoint his heads in charge of the various departments.

"The division headquarters should be located as may be most convenient. The directing manager should be completely in control of his division and reporting, as I have said, only to the Minister of Railways. I would have this directing manager devote his entire time and abilities to the interests of the railway in the division which he controls."

Dealing with railway freight rates Senator John McCormick, of Nova Scotia, said:

"We find men on the prairies complaining in recent years because they have not been granted concessions that have been denied to others. But not only do we find that; we find also that in some sections freight has been carried at a loss for the benefit of the people of those sections while others have had to bear the loss.

"These are some of the things that must be remedied, things that this House and Parliament must address themselves to. We cannot go on year after year losing population and thereby paralyzing industry. In the Province of Nova Scotia, as a result of want of policy or, in fact, as a result of discrimination, villages have been almost entirely depopulated.

"What do we find on the Pacific coast as compared with the East as to the rates charged for carrying freight? The rate from the East to a place like Winnipeg is \$10.06 a hundred. The rate from the West is \$4.08½. The rate to Toronto from the East is \$2.12; from the West \$1.67. In the matter of fish which is almost entirely transported by the government road, we find a discrimination against our people; and that discrimination is in favor of American fishing vessels, because our people have to pay a duty of 2 cents a pound when they send halibut into the United States. These are things that we think ought to be redressed.

"The other day an announcement was made with regard to railway rates. It is stated in another place that the Railway Board would handle the question. That is a board of experts created by the statesman Sir Wilfrid Laurier, and no doubt it is composed of men who should handle the matter. But what is the suggestion? Under the Crowsnest Pass rates the farmers ship wheat and flour at less than cost; and it is provided that no increase on those rates shall be made. Therefore the Railway Board will be precluded from charging proper rates for those articles

which constitute a very large part of the traffic carried by the railroads.

"I do not see why it should be stipulated in that proposal that the Crowsnest Pass agreement shall be maintained."

The Political Line-Up on the Canadian Rate Question

One of the most strenuous fights in the present session of the Canadian Parliament opened on Tuesday of this week with the commencement of the debate on the Federal Government's proposed freight rate policy as outlined in the Order in Council made public about ten days ago and summarized in last week's issue of the *Railway Age*. In a general way the Progressive party, representing the three Prairie Provinces, demands the retention of the Crow's Nest Pass agreement in its entirety, or something equivalent to that; the Conservatives urge that the Dominion Railway Board be absolutely unfettered in its dealing with the nation-wide situation, and that the Crow agreement be completely eliminated; while the Liberals, the government party, through the Minister of Railways and Canals, favor a middle course by retaining the Crow agreement in so far as eastbound rates on grain and flour are concerned, and giving the Railway Board a free hand outside those grain and flour rates.

In the first day of the debate on Tuesday the government's position was stated in a brief speech by the Minister of Railways and Canals, who was followed by H. H. Stevens, a prominent Conservative and a cabinet minister in the last Conservative government, after whom spoke Robert Forke, the Progressive leader. As a very large percentage of the 65 Progressive members will speak on this question, it is expected that the debate will last three or four days before a vote is taken. It is expected that when the bill reaches the Senate it will receive favorable consideration there.

Briefly reviewing the various decisions of the Railway Board, the federal cabinet and the Supreme Court of Canada on the Crow's Nest pact, Mr. Graham in his speech declared that all these decisions had created "a chaotic condition which was almost indescribable in some parts of the Dominion." It was a situation that could not be tolerated. The present bill was to provide for the removal of discrimination and empower the Railway Board to equalize rates as far as possible. The Minister then gave some examples of discrimination in rates and added, "I say without any hesitation that this Parliament could break the railways of Canada, if it so desired, and any action we take should be taken after very careful consideration." If the Crow's Nest rates were retained in their entirety, Mr. Graham said, the railways could not stand such an application. The desire of the government was to give the people of Canada a fair chance in every part of the Dominion without doing injustice to any part. If the Crow rates were retained, as far as the Canadian National was concerned, the Minister declared that the government of Canada would not be responsible for the effect upon the financial situation which that system would be placed in.

The Crow's Nest agreement had given the East some advantages as well as the West, said the Minister. It gave the Eastern producer a chance to ship a large number of commodities to the West at reduced rates. As far as the Western producer was concerned, it provided that the mileage of the Canadian Pacific in the Prairie Provinces, or 2,951 miles at the date of the agreement, should give the reduced rate on grain and flour. As a matter of fact, the Prairie Provinces at present were getting the benefit on 8,084 miles of the C. P. R. in the prairie provinces, and in addition over 9,000 miles of the Canadian National. But the bill before the House provided statutory rates on the Canadian National, whereas at present these rates were granted under decisions of the Railway Board and because of the non-discrimination clauses of the Railway Act.

Mr. Stevens, a British Columbia member, asked why, if the scope of the Crow agreement could be extended so as to be applicable to territory north of the original C. P. R. lines (the agreement provided only for the reduced rates on the C. P. R. lines in existence when the pact was signed in 1897), it could not be extended westward so as to include British Columbia.

Mr. Graham, in reply, said that the agreement in its application to the Prairie Provinces dealt only with eastbound traffic. This principle was being carried out in the proposed legislation. The agreement provided for a reduction of 3 cents a hundred pounds in the rate on grain and flour shipped from

(Continued on page 1604)

REVENUES AND EXPENSES OF RAILWAYS

THE JOURNAL OF CLIMATE VOL. 19, NO. 10, OCTOBER 2006

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1925—CONTINUED

Name of road	Operating expenses					Operating ratio.	Net from railway operation.	Operating income (or loss).	Net after rents, 1924.	Net after rents.
	Average mileage operated during period.	Freight.	Passenger. (inc. misc.)	Maintenance of equipment.	Total.					
Chicago, Milwaukee & St. Paul... Apr. 11, 205	\$9,103,520	\$1,395,298	\$11,760,479	\$2,176,190	\$185,275	4,638,771	\$360,754	\$10,555,891	\$54,904	-\$69,187
Chicago, Milwaukee & St. Paul... Apr. 11, 204	37,383,920	6,066,443	48,412,174	5,692,389	12,397,259	759,066	20,197,821	1,393,078	3,266,702	2,775,639
Chicago, Peoria & St. Louis... Apr. 215	57,285	6,824	70,122	14,96	1,165	1,65	8,586	72,783	4,769,043	2,717,126
Chicago River & Indiana... Apr. 19	316,391	39,828	388,971	60,738	74,553	6,552	197,507	33,052	2,661	88,622
Chicago, Rock Island & Pacific... Apr. 7,578	28,179,397	7,426,867	38,554,38	4,171,407	9,216,337	868,597	214,021	215,536	3,545	83,735
Chicago, Rock Island & Gulf... Apr. 461	332,071	63,894	439,509	67,796	15,584	68,728	273,849	61,874	1,144,588	391,155
Chicago, Rock Island & Gulf... Apr. 1,749	1,549,040	301,296	2,019,359	275,650	27,722	27,629	423,076	7,706,354	4,769,043	2,775,639
Chic., St. Paul, Minn. & St. Louis... Apr. 6,999,110	3,328,771	382,010	1,861,282	1,686,407	114,453	3,851,194	300,021	6,815,663	16,541	2,717,126
Cincinnati, Indianapolis & Western. Apr. 347	1,285,029	25,531	357,055	52,371	70,627	15,401	155,199	15,525	389,198	113,792
Clinchfield Railroad... Apr. 309	2,686,040	126,883	27,951	72,747,64	80,590	62,215	657,692	50,487	1,581,109	760,571
Colorado & Southern... Apr. 1,056	640,808	112,666	822,934	128,064	230,762	15,401	155,199	15,525	389,198	113,792
Ft. Worth & Denver City... Apr. 455	2,968,829	449,459	375,654	460,619	93,840	52,066	1,479,141	16,407	1,272,892	83,80
Wichita Valley... Apr. 271	85,566	48,364	84,129	107,325	28,888	40,822	761,601	90,962	1,564,682	780,80
Columbus & Greenville... Apr. 167	92,248	48,364	20,867	50,1373	14,651	2,551	77,076	848,418	77,076	1,132,495
Delaware & Hudson... Apr. 992	12,006,602	3,011,409	245,521	377,503	3,978,722	193,586	1,272,892	1,272,892	1,272,892	1,272,892
Delaware, Lackawanna & Western... Apr. 992	5,600,319	1,039,267	75,33,639	75,33,639	6,440,260	1,560,356	1,272,892	1,272,892	1,272,892	1,272,892
Denver & Rio Grande Western... Apr. 2,566	7,428,199	1,312,375	9,477,095	1,550,431	2,033,118	191,767	1,272,892	1,272,892	1,272,892	1,272,892
Denver & Salt Lake... Apr. 255	94,469	22,406	42,546	42,546	158,073	354,140	1,272,892	1,272,892	1,272,892	1,272,892
Detroit & Mackinac... Apr. 375	104,985	17,612	135,316	81,883	140,376	1,975	52,983	5,82	126,078	93,20
Detroit, Toledo & Ironton... Apr. 420	1,195,096	26,636	4,38,475	618,246	651,929	34,676	1,142,115	1,142,115	1,142,115	1,142,115
Elgin, Joliet & Eastern... Apr. 4 mos.	276	438,292	5,716	479,355	81,805	1,430,015	2,507	7,827	1,272,892	1,272,892
N. Y., Susquehanna & Western... Apr. 135	3,010	225,532	89,879	230,521	346,618	424,332	45,505	732,625	87,941	1,272,892
Duluth, Missabe & Northern... Apr. 305	900,788	7,899	979,638	163,327	194,658	2,033,118	1,272,892	1,272,892	1,272,892	1,272,892
Duluth, Winnipeg & Pacific... Apr. 178	768,876	49,536	842,205	98,684	150,842	1,272,892	1,272,892	1,272,892	1,272,892	1,272,892
New Jersey & New York... Apr. 45	98,860	400,046	8,977,016	212,024	545,726	1,272,892	1,272,892	1,272,892	1,272,892	1,272,892
N. Y., Susquehanna & Western... Apr. 135	316,369	55,578	415,948	42,149	46,280	2,050,839	51,861	145,948	1,272,892	1,272,892
Erie R. R. ... Apr. 135	2,055	6,642,153	997,396	8,377,087	1,913,526	1,924,054	600,997	13,697,128	1,153,016	28,309,532
Evansville, Indiana, & Terre Haute... Apr. 146	1,024,476	4,013,084	32,404,492	3,737,893	143,446	120,932	1,272,892	1,272,892	1,272,892	1,272,892
Florida East Coast... Apr. 770	1,399,582	16,086	785,535	99,326	139,616	7,210	2,083	59,671	4,447	1,272,892
Fort Smith & Western... Apr. 249	123,540	494,451	67,187	177,711	244,948	177,711	35,045	2,083	52,891	1,272,892
Galveston Wharf Co... Apr. 13	1,024,476	4,013,084	32,404,492	3,737,893	143,446	120,932	1,272,892	1,272,892	1,272,892	1,272,892
Georgia R. R. ... Apr. 406	328	382,582	85,927	504,221	51,256	86,392	22,404	10,252	389,656	73,30
Georgia & Florida... Apr. 406	1,506,399	2,476,763	2,000,747	225,621	405,102	91,085	845,152	81,570	1,647,838	274,544
Georgia & Florida... Apr. 406	105,550	15,209	127,297	17,598	15,329	7,882,997	7,487	7,119	96,475	5,097
Georgia & Florida... Apr. 406	55,851	55,851	52,355	77,214	67,390	31,008	207,828	29,817	111,215	67,276

June 20, 1925

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1925—CONTINUED

Name of road	Average mileage operated during period.	Operating revenues			Operating expenses			Net trans- portation ratio.	Operating income (or loss).	Net after rents.	Net after rents, 1924.
		Freight.	Passenger. (inc. misc.)	Total	Way and structures.	Maintenace of Equipment.	Traffic. per cent.				
Grand Trunk Western.....Apr.	347	\$1,316,107	\$140,280	\$1,457,331	\$152,237	\$37,387	541,169	57,129	\$1,210,602	78,70	\$326,729
4 mos.	4,652,904	596,628	555,621	509,894	1,510,629	141,829	2,224,062	215,532	4,631,715	83,30	925,596
Atlantic & St. Lawrence.....Apr.	166	182,987	34,661	222,892	32,244	26,223	51,740	102,914	76,674	75,90	55,901
4 mos.	166	727,386	90,578	134,621	138,192	50,127	31,832	83,8101	92,020	72,767	6,220
Chic. Det. & Canada Gr. Tr. Jct. ....Apr.	59	190,279	2,839	240,459	28,766	10,702	4,205	77,345	14,705	127,476	53,00
Det. Grand Haven & Milwaukee.....Apr.	189	884,212	17,643	1,070,319	67,641	10,402	15,451	32,902	14,354	46,806	103,751
4 mos.	189	503,116	20,126	572,684	72,759	5,911	11,295	23,754	18,354	39,187	46,779
Great Northern.....Apr.	8,252	5,635,746	912,290	6,381,754	1,341,930	196,816	2,736,285	22,196	5,951,118	81,40	1,358,808
4 mos.	8,251	21,564,335	3,983,415	28,398,228	3,763,545	5,317,721	65,803	11,64,437	22,586,410	22,586,410	5,812,418
Green Bay & Western.....Apr.	234	105,727	7,913	121,087	26,758	16,806	4,094	4,824	3,262	94,526	19,061
4 mos.	234	411,301	42,140	486,411	65,953	15,847	18,960	11,071	36,111	124,733	11,396
Gulf & Ship Island.....Apr.	307	226,213	34,740	293,138	44,667	17,977	7,698	14,814	205,738	70,10	87,380
4 mos.	465	498,983	149,394	1,232,233	172,316	21,433	34,238	63,221	83,766	67,70	398,517
Gulf, Mobile & Northern.....Apr.	465	1,873,860	136,796	2,092,752	318,852	89,667	21,433	15,256	24,414	378,459	69,41
Hocking Valley.....Apr.	348	3,883,536	22,194	4,074,269	67,539	12,744	34,238	62,664	101,112	150,739	71,85
4 mos.	348	4,699,265	528,561	5,285,861	536,001	1,274,373	56,435	43,958	159,262	4,126,502	71,10
Illinois Central.....Apr.	4,875	8,578,269	1,805,416	11,679,99	2,751,177	2,746,301	215,164	4,185,357	1,319,238	79,80	1,159,339
4 mos.	4,875	36,194,120	8,207,094	48,718,316	6,219,866	10,615,840	18,12,199	1,296,580	37,362,626	76,70	11,355,650
Yazoo & Mississippi Valley.....Apr.	1,380	3,668,189	240,220	7,711,422	1,95,184	314,092	30,657	64,669	47,523	1,24,492	77,40
4 mos.	1,380	5,944,532	1,021,692	7,423,127	1,22,177	223,093	115,192	11,64,330	188,934	363,367	72,30
Illinois Central Combined Report.....Apr.	6,255	9,946,458	2,046,142	13,391,421	2,046,142	3,060,393	245,821	4,831,026	384,911	2,748,091	75,50
4 mos.	6,255	42,386,652	9,228,786	56,141,443	7,332,153	11,838,923	999,361	20,844,211	1,485,514	42,725,993	76,10
Kansas City, Mexico & Orient.....Apr.	272	221,840	6,636	27,142	948,601	15,199	212,568	24,019	90,483	96,620	38,689
4 mos.	465	1,034,399	11,103	274,840	50,534	11,22,261	188,297	209,721	25,656	234,431	72,60
Kans. City, Mex. & Orient of Tex. ....Apr.	465	274,840	50,534	11,22,261	188,297	209,721	25,656	208,984	21,984	208,984	72,60
Kansas City Southern.....Apr.	773	1,156,746	119,127	1,418,615	272,667	45,652	464,569	74,241	1,042,836	73,50	357,779
4 mos.	773	4,675,618	5,682,376	1,473,855	1,76,624	1,073,855	174,981	1,894,131	298,549	72,90	1,538,938
Texarkana & Ft. Smith.....Apr.	91	200,146	10,339	224,145	16,633	16,633	24,821	82,805	10,029	14,318	6,906
4 mos.	81	814,197	43,212	917,171	10,982	74,441	20,946	280,859	32,502	523,036	57,00
Kansas, Oklahoma & Gulf.....Apr.	314	165,987	6,479	17,153	58,209	12,962	33,895	38,98	6,521	17,159	11,150
4 mos.	314	617,241	30,239	669,182	24,982	125,268	33,895	38,98	6,521	17,159	11,150
Lake Superior & Ishpeming.....Apr.	161	96,575	2,964	110,939	30,244	24,309	2,497	3,249	5,144	10,643,330	10,807
4 mos.	161	286,1122	28,288	328,461	105,466	105,683	20,013	19,360	19,364	11,15,450	11,313,064
Lake Terminal R. R. ....Apr.	13	.....	.....	83,455	14,910	16,732	.....	54,703	1,732	89,077	10,550
4 mos.	96	255,802	2,443	269,256	52,250	29,607	70,793	2,064	94,930	12,920	83,36
Lehigh & Hudson River.....Apr.	96	955,273	11,334	1,018,605	108,110	186,795	8,049	398,064	40,497	741,515	72,80
Lehigh & New England.....Apr.	219	468,599	7,299	1,617,647	17,797	1,426,855	21,967	53,567	18,162	994,754	62,30
4 mos.	219	1,581,768	6,333,949	6,999,918	6,24,137	1,035,093	1,20,217	2,49,637	14,536	1,20,217	72,50
Lehigh Valley.....Apr.	1,374	5,111,320	2,328,875	2,328,875	2,72,127	1,05,503	45,281	55,278	52,701	19,187,279	77,70
Louisiana & Arkansas.....Apr.	302	310,713	20,627	340,723	57,672	66,512	10,176	92,670	12,385	238,358	70,00
4 mos.	302	1,173,952	97,688	1,303,722	97,955	254,977	41,541	50,149	47,172	994,754	72,56
Louisiana Ry. & Nav. Co. of Tex. ....Apr.	337	1,008,631	1,164,471	1,164,471	1,164,471	1,164,471	10,924	11,30,067	11,207	1,231,133	93,10
4 mos.	337	1,008,631	1,164,471	1,164,471	1,164,471	1,164,471	10,924	11,30,067	11,207	1,231,133	93,10
Louisiana Ry. & Nav. Co. of Tex. ....Apr.	206	364,829	6,797	422,059	18,660	10,567,590	84,661	3,444	47,694	5,541	90,878
4 mos.	206	8,172,154	1,663,076	10,267,590	1,668,360	2,593,580	208,181	3,87,759	207,326	8,021	395,585
Louisville Henderson & St. Louis.....Apr.	199	200,306	50,829	273,612	52,406	125,822	6,907	92,587	9,452	187,174	68,50
4 mos.	199	985,093	207,368	1,267,515	1,267,515	1,267,515	12,993	20,995	40,013	1,267,515	72,30
Maine Central.....Apr.	1,207	1,149,887	289,864	1,587,672	335,202	1,207	12,991	63,395	48,473	1,286,030	75,50
4 mos.	1,207	4,883,480	1,257,970	6,713,172	1,010,019	1,31,107	49,396	2,719,432	196,780	5,30,5,962	79,00
Midland Valley.....Apr.	364	311,305	41,259	1,437,541	71,362	69,998	189,016	24,674	43,524	108,728	19,074
4 mos.	364	1,209,975	167,257	1,437,541	208,389	189,016	287,722	10,924	76,533	928,395	64,50
Minneapolis & St. Louis.....Apr.	1,638	8,665,463	87,586	1,025,020	1,025,020	1,025,020	389,052	31,85	50,1664	4,13,189	1,21,014
4 mos.	1,638	4,130,683	43,008	4,838,518	814,716	1,080,839	122,376	2,319,963	199,375	4,531,170	93,60
Minneapolis, St. Paul & S. S. Marie.....Apr.	4,403	2,892,530	406,545	3,554,474	518,294	2,81,423	627,840	12,795	1,43,574	11,532	1,51,945
4 mos.	4,403	11,010,510	1,866,256	13,930,781	1,826,350	2,81,423	627,840	9,57,581	1,28,473	11,39,296	1,28,473
Duluth, South Shore & Atlantic.....Apr.	590	345,340	1,744,001	4,433,337	66,915	76,115	7,299	187,492	13,394	2,88,156	95,181
4 mos.	590	1,326,363	342,947	1,793,675	216,817	30,292	27,212	783,103	46,467	1,44,421	80,50
Spokane International.....Apr.	165	289,781	49,845	361,081	46,222	12,663	130,681	6,6163	64,041	69,30	28,34
4 mos.	165	109,120	142,855	19,486	36,117	12,663	130,681	6,6163	64,041	69,30	28,34
Mississippi Central.....Apr.	185	438,534	505,459	67,076	86,186	27,750	149,170	71,70	142,649	105,388	115,964

REVENUES AND EXPENSES OF RAILWAYS

MONTHS OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1925—CONTINUED

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL AND FOUR MONTHS OF CALENDAR YEAR 1925—CONTINUED

Name of road	Average mileage operated during period.			Operating revenues—			Maintenance of equipment.			Operating expenses—			Net from railway operation.			Operating income (or loss).			Net after rents, 1924.		
	Freight.	Pasenger.	Total	Way and structures.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Operating ratio.	Total.	General.	Traffic.	Transportation.	General.	Traffic.	Transportation.	General.	Traffic.	Transportation.	
Baltimore, Chesapeake & Atlantic, Apr. 4 mos.	\$71,916	\$29,987	\$109,563	\$12,991	\$18,36	\$27,851	\$3,203	\$14,461	128.20	—\$30,98	—\$33,893	—\$34,967	—\$30,572	—\$34,967	—\$30,572	—\$34,967	—\$30,572	—\$34,967	—\$30,572		
Long Island Apr. 4 mos.	251,954	94,586	371,537	43,664	6,403	29,514	13,632	49,793	134.50	—126.216	—129.596	—136.895	—136.895	—136.895	—136.895	—136.895	—136.895	—136.895	—136.895		
West Jersey & Seashore, Apr. 4 mos.	397	897,559	1,704,512	2,829,411	420,533	2,255,917	1,255,009	2,317,910	81.90	51.501	403,971	300,264	300,264	300,264	300,264	300,264	300,264	300,264	300,264	300,264	
Peoria & Pekin Union Apr. 4 mos.	397	3,200,639	6,237,971	10,201,838	1,499,586	1,981,051	82,742	5,020,530	86.70	1,365,348	1,130,827	870,301	870,301	870,301	870,301	870,301	870,301	870,301	870,301	870,301	
Pere Marquette Apr. 4 mos.	360	1,497,315	570,993	2,052,635	163,535	152,93	521,930	52,995	20.643	3,279,955	219,604	162,961	141,332	141,332	141,332	141,332	141,332	141,332	141,332		
Pittsburgh & Shawmut Apr. 4 mos.	19	114,984	14,825	3,296	1,356,721	27,634	15,212	1,003	6,200	8,070	11,130	8,310	2,23,102	1,130,661	1,130,661	1,130,661	1,130,661	1,130,661	1,130,661		
Pittsburgh & West Virginia Apr. 4 mos.	92	2,666,795	296,887	3,208,012	415,847	761,864	49,410	1,146,733	97,985	2,475,552	77,20	73,24,604	575,114	502,406	502,406	502,406	502,406	502,406	502,406		
Pittsburgh, Shawmut & Northern Apr. 4 mos.	263	10,363,818	1,249,112	12,549,044	1,256,375	2,967,124	206,818	4,860,538	9,683,240	7,720	2,865,804	2,298,804	2,103,191	1,871,461	1,871,461	1,871,461	1,871,461	1,871,461	1,871,461		
Quincy, Omaha & Kansas City Apr. 4 mos.	92	324,118	7,008	365,575	31,572	88,749	6,850	1,146,733	97,985	2,475,552	77,20	73,24,604	575,114	502,406	502,406	502,406	502,406	502,406	502,406		
Reading Company Apr. 4 mos.	139	6,595,696	796,003	7,676,914	1,170,464	1,81,674	65,544	1,146,733	97,985	2,475,552	77,20	73,24,604	575,114	502,406	502,406	502,406	502,406	502,406	502,406		
Atlantic City Apr. 4 mos.	250	172,048	70,831	272,848	1,163,028	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540	1,166,540		
Perkins Apr. 4 mos.	41	139	25,682,380	3,370,354	30,486,283	3,663,657	7,128,838	273,980	11,553,905	711,406	23,308,896	76,50	7,117,376	22,093	472,921	81,40	106,922	13,844	83,725	13,844	
Port Reading Apr. 4 mos.	19	126,665	171,859	327,666	109,069	38,963	6,954	181,429	20,379	29,389	16,494	104,10	14,217	14,217	14,217	14,217	14,217	14,217	14,217		
Richmond, Fredericksburg & Potowmack Apr. 4 mos.	117	505,960	543,460	1,107,479	408,324	175,823	9,229	1,146,733	97,985	2,475,552	77,20	73,24,604	575,114	502,406	502,406	502,406	502,406	502,406	502,406		
St. Louis-San Francisco Apr. 4 mos.	41	89,681	4,776	98,173	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464		
Rutland Apr. 4 mos.	413	333,589	91,394	528,356	88,378	117,002	9,904	220,933	33,298	33,298	95,059	57,80	69,324	53,961	70,076	53,961	70,076	53,961	70,076	53,961	
St. Louis-San Francisco & Tex. Apr. 4 mos.	137	366,017	1,199,870	394,958	351,193	1,427,270	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322		
Pt. Worth & Rio Grande Apr. 4 mos.	233	366,017	1,162,611	1,169,227	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464	1,170,464		
St. Louis, San Francisco & Tex. Apr. 4 mos.	137	662,138	51,541	736,129	94,200	316,078	25,490	20,271	255,490	29,710	51,739	103,80	—4,582	—8,539	—19,148	—19,148	—19,148	—19,148	—19,148	—19,148	
St. Louis Southwestern of Tex. Apr. 4 mos.	807	1,192,151	108,276	1,385,662	198,625	1,327,483	203,160	1,503,392	56,586	99,092	72,00	388,570	346,159	66,048	71,011	71,011	71,011	71,011	71,011	71,011	
San Antonio & Aransas Pass Apr. 4 mos.	739	436,042	42,276	508,507	151,389	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322	1,127,322		
San Antonio, Uvalde & Gulf Apr. 4 mos.	318	1,705,803	190,894	2,027,206	568,074	583,791	43,984	870,308	93,012	2,152,251	106,20	—125,051	—191,520	—200,983	8,831	8,831	8,831	8,831	8,831	8,831	
Southern Ky. Apr. 4 mos.	41	137,139	15,187	166,024	19,706	15,831	4,630	57,139	6,496	109,072	65,70	56,952	53,522	30,864	30,864	30,864	30,864	30,864	30,864		
Seaboard Air Line Apr. 4 mos.	3,778	3,833,630	802,143	5,183,863	652,797	833,704	164,615	1,180,273	173,680	3,891,579	75,10	1,292,284	1,060,666	826,173	826,173	826,173	826,173	826,173	826,173		
Alabama Great Southern Apr. 4 mos.	318	640,826	84,026	743,826	1,118,155	20,625,334	2,555,794	3,399,102	673,564	7,901,436	689,351	15,552,617	75,40	5,072,717	4,166,913	3,348,994	3,348,994	3,348,994	3,348,994	3,348,994	
Cin., New Orleans & Tex. Apr. 4 mos.	318	2,517,991	589,079	3,301,731	4,118,155	12,221,292	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571	2,778,571		
Northern Alabama Apr. 4 mos.	110	117,951	8,848	130,347	24,121	4,350	20,319	262,808	23,672	56,04,038	67,70	269,122	219,620	233,540	162,625	162,625	162,625	162,625	162,625		
Georgia Southern & Florida Apr. 4 mos.	401	287,822	110,017	438,529	63,976	61,254	10,687	160,868	10,785	313,447	71,50	125,082	105,177	74,145	11,424	11,424	11,424	11,424	11,424		
New Orleans & Northeastern Apr. 4 mos.	207	1,101,769	488,930	1,888,727	260,281	237,126	39,763	680,171	41,343	1,284,565	68,00	614,172	506,265	315,240	141,830	141,830	141,830	141,830	141,830		
Northern Alabama Apr. 4 mos.	207	1,101,769	3,301,644	47,817,038	57,507	65,655	10,934	14,041	14,041	14,041	14,041	14,041	14,041	14,041	14,041	14,041	14,041	14,041	14,041		
Southern Pacific Apr. 4 mos.	8,722	10,639,124	3,312,824	15,310,941	2,567,243	2,953,243	89,134	84,465	157,619	12,476,952	9,589,138	1,635,921	1,635,921	1,635,921	1,635,921	1,635,921	1,635,921	1,635,921	1,635,921	1,635,921	
Southern Pacific Apr. 4 mos.	8,722	12,103,983	61,351,690	9,648,025	11,693,656	1,448,286	1,448,477	996,093	1,373,111	159,975	2,149,906	201,551	4,952,625	66,60	2,109,497	2,065,425	1,756,364	1,756,364	1,756,364	1,756,364	

REVENUES AND EXPENSES OF RAILWAYS

אלאן קאנטן אנד ווון מונטגנו כורנells Year 1925 Source

MONTH OF APRIL, AND FOUR MONTHS OF CALENDAR YEAR 1923—CONTINUED

Name of road	Average mileage operated during period.		Operating expenses						Net from railway operation.		Net after rents.	Net after 1924.		
	Freight.	Passenger. (inc. misc.)	Total.	Maintenance of Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.				
Atlantic Steamship Lines ⁸ Apr. 1, 1923	\$38,640	\$914,881	\$953,521	\$20,243	\$629,817	\$28,409	\$893,139	\$11,742	\$8,781,185	—\$2,913	—\$78,185			
Galveston, Harrisburg, & S. Antonio ¹ Apr. 1, 1923	3,000,608	1,687,786	4,684,353	58,389	280,281	82,693	2,987,817	115,242	4,142,768	—\$2,650	—\$2,650			
Houston & Texas Central Apr. 1, 1923	1,361,332	353,246	1,714,578	401,473	451,153	64,907	93,417	1,562,592	28,9,617	343,884	—\$15,127	101,519		
Houston & Texas Central Apr. 4 mos.	1,379	5,548,962	7,616,760	1,370,066	1,582,771	1,844,432	2,634,169	359,914	6,209,976	81,50	1,407,084	1,150,748	152,721	
Louisiana Western Apr. 1, 1923	764,540	225,559	989,500	1,081,393	302,419	254,962	1,7470	390,453	47,477	1,011,251	93,50	14,311	102,715	
Houston East & West Texas Apr. 4 mos.	929	3,845,389	5,101,563	5,179,231	1,080,586	978,614	106,713	1,699,447	185,694	40,475,585	81,905	612,613	102,715	
Morgan's L. & T. R. R. & S. S. Co. ² Apr. 4 mos.	191	212,738	34,410	260,300	56,906	49,272	3,478	86,130	10,248	205,720	78,90	11,164,646	102,715	
Louisiana Western Apr. 4 mos.	207	225,803	70,729	319,034	211,027	271,624	275,106	147,871	109,290	22,003	299,470	93,90	118,259	83,185
St. Louis Connecting Apr. 4 mos.	400	466,422	115,856	1,003,312	62,340	145,667	155,207	20,093	317,625	4,387,878	686,267	110,10	62,927	222,752
St. Louis Merchants' Bridge Term. Apr. 4 mos.	400	2,019,528	486,720	2,701,283	530,184	696,493	75,901	1,202,908	155,637	2,679,649	99,20	114,366	14,326	63,996
Texas & New Orleans Apr. 4 mos.	535	2,709,944	98,063	3,515,405	598,293	83,454	117,417	10,105	125,076	57,555	1,250,607	83,10	211,925	14,326
Terminal Railroad Assoc. of St. L. ³ Apr. 4 mos.	554	435,146	97,293	601,835	83,454	117,417	10,105	125,076	57,555	1,250,607	83,10	182,662	107,484	
Tennessee Central Apr. 4 mos.	554	1,694,778	390,159	2,346,828	269,116	431,099	38,701	751,817	83,004	1,604,226	68,40	244,742	327,162	
East St. Louis Connecting Apr. 4 mos.	296	189,439	34,111	229,031	42,285	43,733	7,391	87,665	36,351	191,855	80,30	47,176	20,242	
St. Louis Transfer Ry. Apr. 4 mos.	544	120,076	140,891	972,522	191,230	206,543	13,826	1,691,230	128,812	2,923,077	83,10	170,860	153,931	15,234
St. Louis & Western Apr. 4 mos.	37	270,094	395,614	230,066	172,560	74,457	17,724	1,135	1,691,230	128,812	2,923,077	83,10	173,328	173,328
St. Louis Merchants' Bridge Term. Apr. 4 mos.	9	372,667	107,693	360,774	78,200	899	28,204	1,135	1,691,230	128,812	2,923,077	83,10	173,328	173,328
Trinity & Brazos Valley Apr. 4 mos.	368	115,803	9,484	130,978	63,604	43,793	7,391	75,227	2,493	111,921	64,20	62,229	20,242	
Union Pacific Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
Ister & Delaware Apr. 4 mos.	128	175,373	107,693	108,507	26,147	36,508	2,148	63,207	7,066	125,076	55,30	60,533	23,501	
Oregon Short Line Apr. 4 mos.	247	3,722,667	39,180	339,834	92,733	161,953	8,848	285,094	27,832	576,432	110,70	55,508	75,049	
Los Angeles & Salt Lake Apr. 4 mos.	45	3,687	5,080,733	1,224,849	210,379	1,040,011	177	4,161	162	1,231	47,099	80,90	11,066	
St. Joseph and Grand Island Apr. 4 mos.	545	21,326,659	4,805,854	28,355,121	2,851,512	6,701,691	591,646	19,811	2,148	160,437	4,977	125,733	49,371	
Oregon Wash. R.R. & Nav. Co. Apr. 4 mos.	258	258	1,436,630	310,425	1,931,934	445,859	1,257,150	1,040,626	2,582,050	6,852,050	124,576	124,576		
Western Pacific Apr. 4 mos.	545	1,222,023	52,941	1,373,314	245,775	229,447	54,099	30,382	1,257,150	1,040,626	2,582,050	6,852,050		
St. Joseph and Grand Island Apr. 4 mos.	545	5,435,297	244,201	6,139,362	1,054,595	169,432	172,864	11,227	394,299	325,513	3,325,333	454,033		
Utah Apr. 4 mos.	102	106,392	160	107,279	8,669	3,228,492	1,851,133	300,233	426,929	2,525,44	5,723	76,449	71,30	
Iriginian Apr. 4 mos.	102	566,272	1,653	1,257,150	1,257,150	1,020,058	152,480	2,062,235	1,263,642	1,263,642	84,00	295,472	153,506	
Western Pacific Apr. 4 mos.	1,207	1,339,764	3,442,293	7,019,490	887,841	1,508,444	1,508,444	2,651,028	2,561,809	2,561,809	83,50	1,217,628	120,919	
St. Joseph and Grand Island Apr. 4 mos.	258	5,140,308	1,352,776	1,177,553	1,020,058	1,257,150	1,257,150	901,199	1,236,126	1,236,126	83,10	387,707	120,919	
Oregon Wash. R.R. & Nav. Co. Apr. 4 mos.	258	915,592	78,716	1,054,595	1,481,996	1,441,062	1,441,062	11,227	394,299	48,130	796,455	75,50		
Los Angeles & Salt Lake Apr. 4 mos.	247	1,766,507	316,656	2,288,492	484,165	458,528	51,773	757,100	114,911	1,026,176	84,20	362,316	117,181	
St. Louis Connecting Apr. 4 mos.	247	2,417	1,766,507	6,260	1,931,934	2,794,914	68,307	786,956	109,624	1,816,095	94,00	115,839	54,149	
Union Pacific Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
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St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
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St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385	49,679	1,036	10,386	50,350	346,875	324,484	
St. Louis & Western Apr. 4 mos.	368	1,065,872	46,558	1,148,538	277,748	23,539	23,385</							

Freight Operating Statistics of Large Steam Roads—Selected Items for April, 1925, Compared

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)			Average number of locomotives on line daily			
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross. Excluding locomotive and tender	Net. Revenue and non-revenue	Servicable	Unserviceable	Per cent unserviceable	Stored	
New England Region:													
Boston & Albany.....	1925	404	242,833	258,529	25,199	5,090	67.9	252,889	94,992	125	20	13.8	...
	1924	394	253,180	268,939	27,604	5,037	67.8	253,808	94,290	128	18	12.6	...
Boston & Maine.....	1925	2,348	501,515	567,536	54,735	12,718	71.9	621,045	251,873	337	121	26.5	28
	1924	2,366	516,004	574,303	54,318	11,863	68.9	598,717	235,894	330	139	29.6	30
N. Y., New H. & Hartf.....	1925	1,931	462,421	480,568	33,813	12,946	70.7	635,072	253,216	294	62	17.4	25
	1924	1,960	469,916	495,688	26,848	12,149	70.5	594,795	239,219	308	65	17.4	29
Great Lakes Region:													
Delaware & Hudson.....	1925	875	360,964	491,253	47,505	9,975	65.8	617,494	303,863	247	37	13.0	76
	1924	887	345,439	472,866	45,316	9,373	63.8	589,235	283,969	257	34	11.7	73
Del., Lack. & Western.....	1925	923	573,274	681,557	89,815	18,190	68.7	1,014,755	451,303	296	62	17.3	38
	1924	993	562,421	661,405	87,643	17,158	67.4	941,326	411,341	301	67	18.2	24
Erie (inc. Chic. & Erie)....	1925	2,325	860,327	957,577	87,360	32,407	65.4	1,906,317	835,007	644	98	13.2	203
	1924	2,325	904,556	993,698	94,417	32,199	65.4	1,911,628	848,485	657	110	14.4	171
Lehigh Valley	1925	1,357	581,775	638,334	74,162	17,712	64.6	1,047,118	469,200	445	74	14.3	104
	1924	1,356	590,319	646,821	67,012	16,803	64.9	984,780	449,029	471	88	15.8	99
Michigan Central	1925	1,826	560,422	578,561	19,213	19,214	63.0	1,007,044	355,048	296	67	18.4	99
	1924	1,827	585,688	604,977	20,373	19,100	64.3	1,001,472	361,103	278	67	19.5	44
New York Central.....	1925	6,478	1,872,146	2,088,484	139,198	71,011	64.0	4,099,333	1,721,711	1,191	393	24.8	383
	1924	6,447	1,949,846	2,174,059	148,660	70,357	64.1	3,963,183	1,637,300	1,208	430	26.3	334
New York, Chic. & St. L.	1925	1,669	615,996	624,389	6,568	19,495	65.9	1,044,299	400,801	248	64	20.5	61
	1924	1,669	646,713	655,042	2,322	19,715	65.5	1,066,700	419,637	234	57	19.5	41
Pere Marquette	1925	2,198	367,620	375,447	6,223	9,517	65.4	539,523	242,626	188	27	12.4	37
	1924	2,227	359,922	371,773	8,724	9,226	66.8	510,153	233,519	188	24	11.4	25
Pitts. & Lake Erie.....	1925	231	116,340	118,361	925	3,901	63.5	284,562	159,686	74	19	20.4	27
	1924	231	110,464	116,780	1,075	3,850	61.8	280,604	159,715	64	21	24.9	14
Wabash	1925	2,497	646,693	674,341	11,178	20,176	67.2	1,088,554	421,660	327	58	15.1	58
	1924	2,459	639,190	659,163	8,982	19,231	69.7	1,016,700	412,605	300	56	15.8	19
Central Eastern Region:													
Baltimore & Ohio.....	1925	5,196	1,735,776	2,006,282	151,547	50,875	65.2	3,117,454	1,483,217	955	290	23.3	124
	1924	5,207	1,771,109	2,019,390	166,455	49,896	64.6	3,016,045	1,435,083	1,024	257	20.1	172
Central of New Jersey.....	1925	692	275,175	303,164	34,961	7,135	61.4	447,771	219,806	223	41	15.5	30
Chicago & Eastern Ill.	1925	945	205,097	205,822	3,545	5,902	65.9	337,435	157,287	132	30	18.8	59
	1924	945	209,184	210,436	3,626	5,508	65.0	319,390	150,224	114	46	28.5	31
Cleve., Cin., Chic. & St. L.	1925	2,376	655,892	695,758	11,288	20,393	62.9	1,265,233	572,524	361	75	17.3	78
	1924	2,379	628,605	661,062	12,234	19,476	63.6	1,186,612	553,373	342	86	20.1	47
Elgin, Joliet & Eastern ¹	1925	460	127,555	138,798	6,174	3,811	63.1	294,816	155,756	76	16	17.0	...
	1924	460	117,742	127,495	5,705	3,574	65.3	267,217	138,863	83	15	15.4	...
Long Island	1925	393	46,710	52,124	13,451	601	56.2	38,279	14,842	41	12	23.3	...
	1924	393	49,725	53,550	10,247	632	56.7	38,851	14,694	42	12	22.2	...
Pennsylvania System	1925	10,930	4,297,865	4,620,679	346,547	122,459	64.9	7,772,749	3,598,357	2,537	879	25.7	196
	1924	10,900	4,157,072	4,467,633	302,052	114,292	66.1	7,134,401	3,354,428	2,707	720	21.0	404
Reading	1925	1,132	612,127	670,981	67,077	15,840	62.0	1,058,756	531,404	400	75	15.8	91
	1924	1,141	613,095	678,545	71,475	15,388	64.1	987,694	497,736	395	77	16.3	105
Pocahontas Region:													
Chesapeake & Ohio.....	1925	2,601	1,058,581	1,116,837	31,837	32,400	57.3	2,567,683	1,393,504	482	102	17.5	43
	1924	2,558	926,579	1,005,155	31,216	26,991	57.0	2,024,063	1,063,462	442	101	18.5	58
Norfolk & Western.....	1925	2,230	758,476	914,339	32,065	24,155	61.2	1,851,136	978,830	565	82	12.7	155
	1924	2,231	714,669	903,824	27,836	21,668	62.4	1,617,604	861,261	558	124	18.1	152
Southern Region:													
Atlantic Coast Line.....	1925	4,890	935,057	955,689	15,523	24,014	61.0	1,294,272	495,690	368	54	12.8	18
	1924	4,865	827,402	834,498	13,177	20,125	63.8	1,046,262	403,987	388	48	11.1	21
Central of Georgia.....	1925	1,907	353,870	354,968	5,102	7,610	68.6	419,581	185,738	153	13	7.6	26
	1924	1,907	305,453	307,573	5,369	6,635	72.4	343,490	155,186	135	20	12.8	10
I. C. (inc. Y. & M. V.)....	1925	6,225	1,629,753	1,644,013	37,562	46,807	63.4	2,881,178	1,184,650	766	111	12.7	85
	1924	6,198	1,658,236	1,675,311	37,303	46,579	63.1	2,853,356	1,169,265	768	132	14.7	63
Louisville & Nashville.....	1925	5,027	1,656,044	1,749,597	64,906	31,529	61.4	2,063,988	974,444	611	108	15.0	53
	1924	5,026	1,616,919	1,713,625	64,615	29,544	63.8	1,867,260	895,155	578	110	15.9	33
Seaboard Air Line.....	1925	3,755	618,748	629,975	11,505	14,807	62.4	843,934	324,725	228	41	15.3	...
	1924	3,548	538,766	549,679	10,975	11,973	62.6	674,505	253,853	216	47	17.8	...
Southern Ry.	1925	6,840	1,558,883	1,597,550	41,723	35,631	63.2	2,009,893	792,913	865	111	11.4	62
	1924	6,820	1,456,130	1,495,565	34,122	33,455	67.2	1,812,874	735,228	861	105	10.9	9
Northwestern Region:													
Chic. & North Western....	1925	8,463	1,293,844	1,321,220	24,060	31,471	64.4	1,719,211	696,639	771	207	21.2	163
	1924	8,463	1,389,042	1,431,577	22,637	31,461	64.4	1,725,309	696,599	838	237	22.0	105
Chic., Milw. & St. P.	1925	11,202	1,417,430	1,488,705	66,966	40,270	65.5	2,237,870	962,837	948	169	15.1	114
	1924	10,983	1,370,978	1,414,821	60,765	37,396	67.1	2,023,680	882,977	951	171	15.3	108
Chic., St. P., Minn. & Om.	1925	1,726	271,324	286,402	10,842	5,561	69.1	278,742	112,486	156	42	21.3	2
	1924	1,726	296,175	318,385	12,988	5,781	70.4	299,011	126,270	167	34	16.8	2
Great Northern	1925</td												

with April, 1924, for Roads with Annual Operating Revenues above \$25,000,000

Region, road and year	Average number of freight cars on line daily					Gross tons per train, excluding locomotive and tender	Net tons per train	Net ton- miles per loaded car	Net ton- miles per car-day	Car miles per car-day	Net ton- miles per ton-mile of road per day	Pounds of coal per 1,000 gross ton-miles including locomotive and tender	Locomo- tive miles per locomo- tive day	
	Home	Foreign	Total	Per cent un- service- able	Stored									
New England Region:														
Boston & Albany.....	1925	2,885	5,765	8,650	2.8	....	1,041	391	18.7	363	28.9	7,835	186	65.3
	1924	2,270	5,284	7,554	4.6	....	1,002	372	18.7	416	32.8	7,979	202	67.8
Boston & Maine.....	1925	14,547	13,269	27,816	8.2	....	1,238	502	19.8	302	21.2	3,575	143	45.3
	1924	14,055	15,430	29,485	11.4	....	1,160	457	19.9	267	19.4	3,324	158	44.7
N. Y., New H. & Hartf.....	1925	20,827	18,651	39,478	21.7	1,605	1,373	548	19.6	214	15.5	4,372	135	48.1
	1924	20,046	17,045	37,091	19.5	....	1,266	509	19.7	215	15.5	4,068	152	46.8
Great Lakes Region:														
Delaware & Hudson.....	1925	9,126	6,329	15,525	6.6	....	1,711	842	30.5	652	32.5	11,573	174	63.3
	1924	10,422	6,620	17,042	4.9	136	1,691	815	30.3	555	28.7	10,666	194	59.4
Del., Lack. & Western.....	1925	16,529	8,050	24,579	3.6	....	1,770	787	24.8	612	35.9	15,156	159	71.8
	1924	16,082	8,908	24,990	3.4	110	1,674	731	23.9	549	34.0	13,814	177	67.8
Erie (inc. Chic. & Erie).....	1925	38,057	19,088	57,145	7.1	12,233	2,216	971	25.8	487	28.9	11,969	126	47.0
	1924	34,439	18,815	53,254	6.3	10,286	2,113	938	26.4	531	30.8	12,166	132	47.3
Lehigh Valley.....	1925	22,508	8,342	30,850	8.2	....	1,800	806	26.5	507	29.6	11,529	151	45.7
	1924	22,642	9,415	32,057	6.5	781	1,668	761	26.7	467	26.9	11,039	168	42.6
Michigan Central.....	1925	15,358	16,124	31,482	5.2	2,263	1,797	634	18.5	376	32.3	6,482	116	54.3
	1924	13,477	15,023	28,500	5.5	1,333	1,710	617	18.9	422	34.8	6,590	125	60.4
New York Central.....	1925	75,259	66,630	141,889	3.4	29,709	2,190	920	24.2	404	26.0	8,860	123	46.9
	1924	64,539	73,096	137,635	5.0	23,526	2,033	846	23.3	396	26.6	8,466	126	47.3
New York, Chic. & St. L.	1925	12,498	10,227	22,725	5.8	4,187	1,695	651	20.6	587	43.3	8,006	116	67.5
	1924	10,581	11,173	21,754	5.6	2,017	1,649	649	21.3	642	46.0	8,383	128	75.1
Pere Marquette.....	1925	10,395	7,887	18,282	6.8	1,722	1,468	660	25.5	442	26.5	3,679	112	59.3
	1924	9,380	10,611	19,991	4.6	1,297	1,417	649	25.3	389	23.0	3,495	133	59.9
Pitts. & Lake Erie.....	1925	16,188	7,197	23,385	5.2	1,766	2,446	1,373	40.9	227	8.8	22,997	70	43.1
	1924	14,602	10,230	24,832	3.0	5,510	2,540	1,446	41.5	214	8.3	23,026	75	46.2
Wabash.....	1925	13,612	10,277	23,889	3.0	850	1,683	652	20.9	587	41.8	5,629	129	59.4
	1924	12,641	9,585	22,226	3.3	845	1,591	646	21.5	618	41.3	5,593	148	62.6
Central Eastern Region:														
Baltimore & Ohio.....	1925	71,868	31,911	103,779	9.3	2,205	1,796	854	29.2	476	25.1	9,515	163	57.8
	1924	70,088	35,756	105,844	8.3	11,684	1,703	810	28.8	452	24.3	9,187	179	56.9
Central of New Jersey.....	1925	18,735	10,186	28,921	3.2	4,429	1,027	799	30.8	253	13.4	10,585	175	42.7
	1924	17,307	10,683	27,990	5.0	3,322	1,535	732	29.3	236	12.7	9,546	190	40.5
Chicago & Eastern Ill.....	1925	15,629	3,688	19,317	17.3	4,761	1,645	767	26.0	270	15.4	5,547	142	43.1
	1924	15,871	3,205	19,776	14.0	4,484	1,527	718	27.3	252	14.3	5,298	169	44.7
Cleve., Cin., Chic. & St. L.	1925	19,336	18,830	38,166	5.0	10,608	1,929	873	28.1	473	28.0	8,031	121	54.1
	1924	15,496	19,358	34,254	5.8	4,853	1,858	880	28.4	493	28.9	7,753	129	52.4
Elgin, Joliet & Eastern ^a	1925	10,208	7,279	17,487	7.8	467	2,311	1,221	40.9	297	11.5	11,292	132	53.1
	1924	10,464	6,833	17,297	6.5	887	2,270	1,179	38.9	268	10.5	10,067	129	45.3
Long Island.....	1925	2,018	5,048	7,066	0.9	91	820	318	24.7	70	5.0	1,258	338	41.0
Pennsylvania System.....	1925	221,057	81,859	302,916	10.6	35,891	1,809	837	29.4	396	20.7	10,974	131	48.5
	1924	201,448	97,859	299,307	9.1	54,952	1,767	807	29.3	374	19.3	10,258	146	46.4
Reading.....	1925	26,118	14,173	40,291	2.3	3,996	1,730	868	33.6	440	21.1	15,654	169	51.8
	1924	22,145	16,197	38,342	3.2	5,802	1,611	812	32.3	433	20.9	14,535	190	53.0
Pocahontas Region:														
Chesapeake & Ohio.....	1925	32,235	9,535	41,770	4.1	2,878	2,426	1,316	43.0	1,111	45.1	17,860	108	65.6
	1924	29,777	11,723	41,500	4.5	7,329	2,184	1,148	39.4	853	38.0	13,858	126	63.7
Norfolk & Western.....	1925	34,002	8,225	42,227	2.9	4,381	2,441	1,291	40.5	773	31.1	14,631	148	48.8
Southern Region:														
Atlantic Coast Line.....	1925	21,077	16,882	37,959	4.3	....	1,384	529	20.6	430	34.2	3,375	123	76.8
	1924	20,921	14,280	35,201	4.6	....	1,265	488	20.1	383	29.9	2,768	132	64.8
Central of Georgia.....	1925	4,802	5,928	10,730	4.7	....	1,186	525	24.4	577	34.4	3,247	153	72.3
	1924	4,467	5,150	9,617	6.1	....	1,125	508	23.4	538	31.7	2,713	161	67.3
I. C. (inc. Y. & M. V.)....	1925	50,980	20,069	71,049	5.2	5,590	1,768	727	25.3	555	34.6	6,343	126	63.9
	1924	45,334	21,737	67,071	4.8	3,067	1,721	705	24.9	581	36.9	6,289	138	63.5
Louisville & Nashville.....	1925	43,800	16,662	60,462	7.9	106	1,246	588	30.9	536	28.3	6,461	160	84.1
	1924	43,188	20,191	63,379	6.4	112	1,155	554	30.3	470	24.3	5,937	172	86.3
Seaboard Air Line.....	1925	11,496	11,855	23,351	3.4	....	1,364	525	21.9	464	33.8	2,883	141	79.3
	1924	9,369	10,022	19,391	6.1	....	1,252	471	21.2	436	32.9	2,385	148	71.2
Southern Ry.	1925	42,268	23,922	66,190	4.5	....	1,289	509	22.3	398	28.3	3,864	167	56.0
	1924	37,121	26,474	63,595	4.9	....	1,245	505	22.0	385	26.1	3,593	182	52.8
Northwestern Region:														
Chi. & North Western.....	1925	50,928	23,919	74,847	9.8	8,975	1,329	538	22.1	310	21.8	2,744	143	45.9
	1924	45,535	26,376	72,911	8.2	....	1,242	501	22.2	318	22.3	2,744	160	45.1
Chi., Milw. & St. L.	1925	54,349	19,001	73,350	9.3	....	1,579	679	23.9	437	27.8	2,865	142	46.4
Chi., St. P., Minn. & Om.	1925	5,354	8,747	12,281	8.7	887	1,027	415	20.9	305	21.0	2,172	149	49.9
	1924	3,481	9,402	12,883	8.									

General News Department

(Continued from page 1595)

the Prairie Provinces eastward to Fort William or points farther East. Under the proposed legislation this principle was retained.

Mr. Meighen, leader of the Conservatives, said that under the proposed measure, while the three cent reduction went into effect on shipments to Fort William, it was possible for the rate eastward from Fort William to be so raised as to nullify the effect of that decrease. Mr. Graham replied that in this respect there was no change from the former legislation. The three-cent reduction in grain and flour shipments from the Prairie Provinces to Fort William and eastward was maintained. The government, said Mr. Graham, was endeavoring to get as far as possible from the making of railway freight rates in Parliament. What was needed was a compromise attitude in order to get rid of some of the complications of the rate situation.

In attacking the bill Mr. Stevens, of the Conservative party, said that no one would admit that the proposed legislation either

solved or offered any compromise on the freight rate situation. It would only accentuate the feeling of discrimination in some parts of Canada. Freight rates should be dealt with entirely by the Railway Board, and the entire Crow agreement should be abolished to make that possible. Mr. Stevens asked that his province, British Columbia, be given an opportunity to plead its cause upon a fair basis. Under the bill the whole aspiration of British Columbia and its hoped-for equitable treatment was "destroyed and proven to be a dream and a snare." The Railway Board, he urged, should be free and unhampered.

"The West wants rates fixed by agreement," said Mr. Forke, in stating the position of the Progressive party. "We have a contract for 27 years and now we are asked to give it up. We are asked to trust the Railway Board which would have wiped out the Crow agreement had it the power to do so. I am inclined to stand solidly behind the agreement until we know what we are going to get." The Prairie Provinces would fight for some statutory maximum rates, and for Crow agreement rates on basic commodities.

OPEAKING REVENUES AND OPERATING EXPENSES OF CLASS I STEAM ROADS IN THE UNITED STATES

(For 192 STEAM ROADS, INCLUDING 16 SWITCHING AND TERMINAL COMPANIES)

FOR THE MONTH OF APRIL, 1925 AND 1924.

Item	United States		Eastern District		Pocahontas Region		Southern Region		Western District	
	1925	1924	1925	1924	1925	1924	1925	1924	1925	1924
Average number of miles operated.....	236,665.33	236,036.00	59,490.92	59,514.92	5,503.84	5,505.32	38,526.55	38,336.11	133,144.02	132,679.65
Revenues:										
Freight	\$347,028,739	\$342,907,280	\$158,305,262	\$156,484,511	\$15,963,842	\$15,439,127	\$50,677,139	\$48,638,546	\$122,082,496	\$122,345,096
Passenger	a 78,373,104	b 85,222,921	39,980,943	41,743,987	1,833,687	2,149,549	11,107,440	11,792,609	25,523,034	29,536,776
Mail	8,162,185	8,157,658	3,177,284	3,185,890	199,611	197,069	1,150,864	1,136,523	3,634,426	3,638,176
Express	13,472,004	12,657,251	6,902,852	5,551,625	349,904	292,379	1,937,163	2,005,969	4,282,085	4,807,278
All other transportation	16,395,226	16,293,674	9,134,108	9,259,028	181,932	274,778	1,237,155	919,522	5,842,031	5,840,346
Incidental	9,432,971	9,367,674	4,852,679	4,876,799	346,898	347,869	1,186,059	1,159,115	3,047,335	2,983,891
Joint facility—Cr.	850,854	819,055	386,623	346,592	15,742	15,214	133,532	144,652	314,957	312,597
Joint facility—Dr.	218,537	193,368	100,951	92,863	1,865	1,626	35,796	30,432	79,925	68,447
Ry. Operat'g. revs....	473,496,546	475,232,145	222,566,800	221,355,569	18,889,751	18,714,359	67,393,556	65,766,504	164,646,439	169,395,713
Expenses:										
Maintenance of way and structures.....	68,091,818	68,036,804	28,113,033	26,991,397	2,821,557	2,901,605	9,827,244	9,304,616	27,329,984	28,839,186
Maint. of equipment.....	104,670,942	107,510,647	50,179,460	51,456,617	4,839,042	4,428,735	12,925,847	13,576,092	36,526,593	38,049,203
Traffic	8,562,903	7,885,594	3,199,846	2,963,939	220,308	197,574	1,491,470	1,353,173	3,651,279	3,370,908
Transportation	171,657,299	177,595,365	81,108,027	85,173,707	5,527,218	5,367,520	23,574,951	24,019,322	61,447,103	62,834,816
Miscel. operations.....	4,103,388	3,968,723	1,869,233	1,885,055	93,839	92,469	344,488	469,238	1,595,828	1,521,961
General	14,442,885	13,950,825	6,330,550	6,214,202	480,654	438,563	1,861,102	1,767,510	5,770,579	5,530,550
Transportation for investment—Cr.	905,822	1,121,024	118,508	148,746	49,865	27,264	172,453	124,171	564,996	820,843
Ry. Optg. expenses..	370,623,413	377,826,934	170,881,641	174,536,171	13,932,753	13,599,202	50,052,649	50,365,780	135,756,370	139,325,781
Net revenue from railway operations	102,873,133	97,405,211	51,685,159	46,819,398	4,956,998	5,115,157	17,340,907	15,400,724	28,890,069	30,069,932
Railway tax accruals.....	28,298,364	27,104,582	11,857,339	11,050,248	1,220,769	1,241,043	3,966,823	3,422,629	11,253,433	11,390,662
Uncollectible ry. revs.	146,553	155,897	70,936	82,952	3,239	3,710	21,338	15,901	51,040	53,334
Ry. operat'g. income.....	74,428,216	70,144,732	39,756,984	35,686,198	3,732,990	3,870,404	13,352,746	11,962,194	17,585,596	18,625,936
Equipment rents — Dr.	6,425,877	6,094,668	3,918,129	4,145,080	d 358,820	d 142,507	1,135,324	937,958	1,731,244	1,154,137
Joint facility rent—Dr.	1,803,104	1,751,536	876,037	1,004,506	93,973	100,886	\$1,436	3,357	751,658	642,787
Net railway operating income	66,199,235	62,298,528	34,962,718	30,536,612	3,997,837	3,912,025	12,135,986	11,020,879	15,102,694	16,829,012
Ratio of expenses to revenues (per cent)....	78.27	79.50	76.78	78.85	73.76	72.67	74.27	76.58	82.45	82.25
FOR FOUR MONTHS ENDED WITH APRIL, 1925 AND 1924										
Average number of miles operated	236,619.95	236,031.53	59,497.76	59,518.88	5,501.76	5,502.06	38,506.36	38,335.37	133,114.07	132,675.22
Revenues:										
Freight	\$1,395,038,308	1,400,809,544	627,213,845	644,606,699	65,713,556	63,860,407	202,670,489	197,972,484	499,440,418	494,369,954
Passenger	c 324,173,205	e 347,478,218	156,958,183	163,056,464	7,526,973	8,190,875	51,122,630	52,313,422	108,567,417	123,917,457
Mail	32,158,542	31,940,666	12,326,340	12,342,522	855,414	785,192	4,582,601	4,517,572	14,394,187	14,295,380
Express	45,543,854	46,659,234	21,932,638	20,731,856	1,116,877	1,044,091	6,713,132	6,810,487	15,781,207	18,072,800
All other transportation	62,866,160	62,278,183	36,087,536	35,888,757	800,240	774,904	4,043,121	3,611,973	21,935,263	22,002,549
Incidental	37,324,035	37,107,419	18,694,306	19,024,167	1,348,879	1,339,630	5,136,710	4,675,772	12,144,140	12,067,850
Joint facility—Cr.	3,478,947	3,709,019	1,570,587	1,410,388	61,895	59,848	527,900	526,097	1,318,565	1,712,686
Joint facility—Dr.	851,594	835,371	403,725	419,012	8,298	8,409	139,886	125,755	299,685	282,195
Ry. operat'g. revs....	1,899,733,457	1,929,146,912	874,379,712	896,641,841	77,415,536	76,046,538	274,656,697	270,302,052	673,281,512	686,156,481
Expenses:										
Maintenance of way and structures.....	241,076,830	237,410,138	102,994,906	98,413,537	10,825,904	10,630,413	36,677,372	35,581,629	90,578,648	92,784,559
Maintenance of equipm.....	423,361,678	438,154,180	205,276,251	213,039,414	18,771,637	18,967,281	52,143,121	54,155,863	147,170,669	151,991,622
Traffic	33,683,534	31,955,014	12,493,148	12,037,741	882,050	800,082	6,134,628	5,798,457	14,173,708	13,318,734
Transportation	718,166,303	752,433,800	339,813,851	361,994,773	23,237,886	24,992,971	97,282,913	99,896,222	257,831,653	265,549,834
Miscel. operations.....	16,676,316	16,066,903	7,818,498	7,775,002	369,033	345,759	2,292,497	1,828,842	6,196,288	6,117,300
General	57,579,622	56,353,811	25,457,071	25,102,639	1,864,340	1,726,347	7,386,588	7,261,910	22,871,723	22,262,915
Transportation for investment—Cr.	3,367,136	3,870,874	571,411	529,069	106,767	84,446	571,605	491,285	2,117,353	2,766,074
Ry. op'tg. expenses..	1,487,177,147	1,528,502,972	693,282,314	717,834,037	55,843,983	57,378,407	201,345,514	201,341,638	536,705,336	549,258,890
Net revenue from railway operations	412,556,310	400,643,940	181,097,398	178,807,804	21,571,553	18,668,131	73,311,183	66,270,414	136,576,176	136,897,591
Railway tax accruals.....	110,926,162	105,392,642	44,080,160	42,031,101	4,877,674	4,712,809	15,766,993	13,707,980	46,201,335	44,940,752
Uncollectible ry. revs.	342,115	689,976	228,708	298,617	24,852	10,534	72,726	59,467	215,829	321,358
Ry. operat'g. income.....	301,088,033	294,561,322	136,788,530	136,478,086	16,669,027	13,944,788	57,471,464	52,502,967	90,159,012	91,655,481
Equipment rents — Dr.	23,995,725	22,579,665	13,131,602	14,786,340	d 1,577,197	d 1,210,496	3,907,297	2,518,971	8,534,023	6,484,550
Joint facility rent — Dr.	6,988,228	6,312,582	3,175,867	2,987,139	379,728	395,357	379,487	317,955	3,053,146	2,612,131
Net railway operating income	270,104,080	265,669,375	120,481,061	118,704,607	17,866,496	14,759,927	53,184,680	49,666,041	78,571,843	82,538,800
Ratio of expenses to revenues (per cent)....	78.28	79.23	79.29	80.06	72.14	75.45	73.31	75.48	79.71	80.05

a Includes \$2,985,936 sleeping and parlor car surcharge. b Includes \$2,997,962 sleeping and parlor car surcharge. c Includes \$11,810,968 sleeping and parlor car surcharge.

d Deficit or other reverse items. e Includes \$11,379,453 sleeping and parlor car surcharge.

Compiled by the Bureau of Statistics, Interstate Commerce Commission. Subject to revision.

Traffic News

The Northern Pacific has re-equipped its Pacific Express with new Pullman equipment consisting of a 10-section lounge car, steel tourist sleeping cars, coaches, a smoker and a dining car.

The St. Louis-Southwestern operated 1,646 passenger trains during April, of which 1,642 arrived at destination on schedule. During May 1,700 trains were operated, 1,685 of which were on time. The record for the two months was 99.43 per cent on time.

The Northern Pacific has applied to the Interstate Commerce Commission for permission to abandon operation on two branch lines in Montana, one running from Helena to Rimini, and the other from Clough Junction to Marysville, each of which is 12 miles in length.

The southern railroads have filed a petition with the Interstate Commerce Commission asking that the commission, in deciding the southern freight rate question, take cognizance of the requirements of the Hoch-Smith resolution. It is stated that the proposed report in this case would require a very material reduction in class rates and that the commission should keep open this avenue for possible increases, to maintain the revenues of the roads, should that be necessary as a result of the commission's general rate structure investigation.

Mo. P. Improves Service to Compete with Buses

To compete with motor buses the Missouri Pacific has placed a motor car and an additional steam train in service between Sedalia, Mo., and Jefferson City, on June 15, making three local trains a day between these points. The slowest train will be 30 minutes faster than the best bus time for the trip. The motor car and trains will stop at all convenient points to take on and discharge passengers.

Colorado & Southern Seeks to Operate Buses

The Denver & Interurban Motor Company has been incorporated for \$250,000 at Denver, Colo., by Robert Rice, vice-president and general manager, J. H. Barwise, Jr., general solicitor, H. A. Johnson, traffic manager, and J. H. Bradbury, comptroller, of the Colorado & Southern, and has asked permission of the Railroad Commission of Colorado to operate motor buses between Denver and Boulder.

Freight Commodity Statistics

The Bureau of Statistics of the Interstate Commerce Commission has issued a tabulation of commodity statistics for the calendar year 1924, based on quarterly reports made by the Class I roads, with a summary, by groups of commodities, and by districts, for each year, 1920 to 1924 inclusive; and also for each commodity class for the year 1924 for each district and for each carrier reporting at the close of the year. The compilation is made from the cumulative figures shown in the last quarterly report for 1924. The detail for individual carriers heretofore contained in the annual "Statistics of Railways in the United States" will be omitted from that publication, in view of the issuance of the present statement.

Mail Pay Rates for Short Lines—

New England Plea to Be Heard

The Interstate Commerce Commission has issued an order establishing as fair and reasonable rates to be received on and after July 1, 1925, for 23 "short line" railroads in the west, for each mile of service by a 15-foot closed-pouch space, for railroads over 100 miles in length, 25 cents; for separately operated railroads not exceeding 100 miles in length and not less than 50 miles in length, 30 cents; for separately operated railroads less than 50 miles in length, 37½ cents. The commission has also ordered a reopening of the mail pay proceeding for re-examina-

tion with respect to the facts and circumstances surrounding the transportation of the mails and the services connected therewith by the Alabama, Tennessee & Northern and the New England railroads; and it has granted a reargument with respect to a finding made on January 22, 1925, as to the rates of pay on the western short lines after June 30, 1921.

Freight Traffic in April

Freight traffic moved by the railroads during the first four months this year amounted to 139,499,311,000 net ton miles, according to reports compiled by the Bureau of Railway Economics. Compared with the corresponding period last year, this was an increase of one-half of one per cent but it was a decrease of 5.7 per cent under the corresponding period in 1923. In the Eastern district, freight traffic during the first four months showed a decrease of two-fifths of one per cent under the same period last year but in the Southern district there was an increase of 2.2 per cent and in the Western district an increase of 1.1 per cent.

For the month of April alone, freight traffic amounted to 33,576,800,000 net ton miles, an increase of 5.2 per cent over the same month last year but a decrease of 12.4 per cent under April, 1923. The Eastern district showed an increase of 7.4 per cent while the Southern district showed an increase of 8.5 per cent. In the Western district there was an increase of four-fifths of one per cent.

The daily average movement per freight car was 26.6 miles per day, an increase of 1.1 miles compared with April last year but 1.4 miles under April 1923. Compared with March this year, the daily average for April was an increase of three-tenths of one mile.

The average load per freight car in April was 25.9 tons, one-fifth of a ton greater than the average for April last year but 1.8 tons under the same month in 1923. The average for April was a decrease of one-fifth of a ton compared with that for March this year.

Wheat Production in 1925

L. M. Betts, manager of the closed car section of the Car Service Division, American Railway Association, has sent to the railroads a statement analyzing the June 1 forecast of the Department of Agriculture, covering wheat production in 1925, as follows:

Summarized, this shows:

	1925	Reduction from 1924
Estimated winter wheat crop.....bu. 407,156,000	182,881,000 or 31%	
Estimated spring wheat crop.....bu. 253,729,000	28,907,000 or 10%	
Total crop .....bu. 660,885,000	211,788,000 or 24%	

The heavy production States of Kansas, Nebraska and Oklahoma, with a crop of 263 million bushels in 1924, now have a prospect less than 161 million bushels, a loss of 40 per cent. The Dakotas and Minnesota, heaviest growers of spring wheat, producing 202 million bushels last year, have in sight now about 140 million bushels, a reduction of 30 per cent.

Generally speaking, intermountain and coast irrigated territory have splendid prospects this year, owing to a good water supply. Conversely, the serious reduction in winter wheat territory is due to heavy winter killing followed by a deficiency of rainfall and sub-normal temperature in the month of May; the latter condition also seriously affecting the spring wheat states.

The best information that can be obtained from the grain trade indicates that owing to the short crop and increased price over last year there will be an initial movement as heavy as last year, but not of as long duration. This primary movement will be to interior mills with substantial consignments to Kansas City and Wichita, also very good movement to Twin Cities, but with exceptionally light movement to the Gulf for export. Interior mills will accumulate considerable in storage. Grain stocks at Kansas City as of the end of the first week in June, show approximately five and one-half million bushels in storage compared with seven and one-quarter million bushels the same time last year and a reduction of over eight million bushels in sixty days.

At the Trans-Missouri-Kansas Shippers' Regional Advisory Board meeting at Tulsa on June 11, the Southwestern and Central Western railroads were optimistic of their ability to protect any movement of grain without difficulty. It was further stated that no emergency measures on the part of the Car Service Division are necessary at this time to meet the situation.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has issued a decision finding that the express rates on corpses have not been found unreasonable in a case instituted by undertakers at Des Moines, New Orleans and Washington, in which two national associations of funeral directors joined as interveners.

The Interstate Commerce Commission on June 12 ordered a revision of rates on grain, grain products and hay from points in Idaho, Montana, Oregon, Utah, Wyoming, Colorado, Kansas, Missouri, Nebraska and Omaha, to points in the southeast and the lower Mississippi valley, effective October 8. The points of origin affected are on the Oregon Short Line, its connections, and the Chicago, Rock Island & Pacific. The rate structures involved pertain to long and short hauls.

Personnel of Commissions

John H. Porter, civil engineer, of St. Louis, has been appointed a member of the Missouri Public Service Commission, in place of E. J. Bean.

The governor of Pennsylvania has appointed Richard W. Martin to the last remaining vacancy on the Public Service Commission, and the complete list of members of the commission is now as follows: William D. B. Ainey, chairman; S. Ray Shelby, James S. Benn, John L. Stewart, J. Henry Scattergood, Harold Evans, Richard W. Martin.

Court News

Liability to Employees for Pranks of Fellow Employees—Unforeseen Occurrences

In an action for injury, four of the counts alleged it to have been caused by a stone thrown by a fellow workman at a train and deflected against plaintiff. The West Virginia Supreme Court of Appeals held that where a railroad company knowingly permits and encourages its employees to indulge in dangerous practices on its premises, although the acts of such employees are beyond the scope of their employment, and totally disconnected therewith, it will be liable to one injured thereby lawfully on its premises at the time of the injury. In the other count it was alleged that the passing train came in contact with the stone and drove it against plaintiff. No explanation was given as to where the stone came from. It was held that negligence could not be inferred from a single occurrence of this character, which could not reasonably have been anticipated; and the master is not compelled to foresee and guard against an accident which reasonable and prudent men would not expect to happen, or to warn the servant of dangers not reasonably to be anticipated.—*Griffin v. Baltimore & Ohio* (W. Va.), 122 S. E. 912.

United States Supreme Court

Cuba Railroad Subsidies Held Not Taxable as Income

The Supreme Court of the United States holds that subsidy payments by the Republic of Cuba to the Cuba Railroad Company (headquarters, New York City), do not constitute taxable income within the meaning of the Sixteenth Amendment. "Neither the laws nor the contracts indicate that the money subsidies were to be used for the payment of dividends, interest, or anything else properly chargeable to or payable out of earnings or income. The subsidy payments taxed were not made for services rendered or to be rendered. They were not profits or gains from the use or operation of the railroad." The action was by the railroad to recover a tax of one per cent on subsidy payments received in 1911 to 1916 paid under protest. Judgment of the federal district court for southern New York in favor of the railroad was affirmed—*Edwards v. Cuba R. R. Co.* Decided June 8, 1925. Opinion by Mr. Justice Butler.

Labor News

Prenter Heads Enginemen

The advisory board of the Brotherhood of Locomotive Engineers has chosen William D. Prenter, first vice-president and treasurer, to succeed the late Warren S. Stone as president in charge of all the brotherhood's activities. L. G. Griffing, who has been vice-president and grand chief engineer of the brotherhood, succeeds Mr. Prenter as first vice-president, and A. Johnston, assistant grand chief engineer, succeeds Mr. Griffing as grand chief engineer. These changes are all pro tem and are effective only until the next triennial convention, which will be held in Los Angeles in 1927.

W. G. Lee Calls Off Cleveland Conference—Plans Wage Increase Demands

W. G. Lee, president of the Brotherhood of Railroad Trainmen, who had invited railroad executives and union leaders to meet in Cleveland on June 29 to discuss methods of bringing closer harmony in industrial relations, has announced the postponement of this meeting. He gives as the reason the conflicting date of the International Railway Congress in London, which would keep a number of railroad executives from attending his meetings. There are, however, only two or three railroad presidents who plan attendance at London.

Co-incident with the announcement of the postponement of the Cleveland meeting comes one to the effect that the conductors and trainmen will hold meetings in November to consider the matter of general wage increases from the railroads.

Meeting of Pennsylvania Shopmen

Representatives of Pennsylvania Railroad shopmen from points east of Altoona and Renovo, Pa., from New York and south to Washington, D. C., and Norfolk, Va., met in New York on June 16, for the fifth annual convention of the Shopcrafts Association of the Pennsylvania's Eastern Region. The meeting was held under the employees representation plan in vogue on the road.

There were 125 delegates in attendance, representing about 18,000 shopmen of the six crafts comprised in the shop workers, to wit: mechanics, boilermakers, blacksmiths, electricians, sheet metal workers and carmen. Each craft was headed by its general chairman. Presiding over the convention was Theodore H. Davis, general chairman of the association.

The representatives unanimously re-elected Theodore H. Davis as their regional general chairman for the two years ensuing. Mr. Davis, who has been regional general chairman since the creation of the Association, is a boilermaker by trade. His home is in Camden, N. J.

Other general divisional chairman chosen by the delegates to the convention, and the several crafts they represent, are: LeRoy C. Phelps, Trenton division—machinists; W. W. Cline, Atlantic division—boilermakers; T. L. Fleming, Schuylkill division—blacksmiths; F. M. Hughes, Middle division—electricians; G. W. Harrington, Baltimore division—sheet metal workers; and E. W. McClain, Philadelphia division—carmen.

The convention was held in the main auditorium of the Y. M. C. A. in the Pennsylvania station. The Rev. J. Mercer Hunt, of Woodlynne, N. J., delivered the invocation, followed by an address by General W. W. Atterbury, vice-president of the system.

Elisha Lee, vice-president of operation, W. B. Wood, general superintendent at New York, and H. A. Enochs, superintendent of the wage bureau also addressed the meeting.

According to a report submitted to the convention last year, out of a total of eight cases carried to the joint reviewing board, seven were decided in favor of the employees. Since the Association was formed four years ago, 153 cases have been taken up of which 85 were decided in favor of the men, 17 were compromised and 25 were withdrawn. The remaining cases, 26 in number, were decided in favor of the management.

Hooper Re-elected Labor Board Chairman

B. W. Hooper, chairman of the United States Railroad Labor Board for several years was re-elected to that office on June 8, and G. W. W. Hanger was re-elected vice chairman.

Honor Memory of Founder of O. R. T.

Officers and members of the Order of Railroad Telegraphers and officers of the Chicago, Rock Island & Pacific unveiled at La Porte City, Iowa, on June 9, a bronze tablet to the memory of Ambrose Duane Thurston, founder and first president of the Order of Railroad Telegraphers. Mr. Thurston organized the Order of Railroad Telegraphers on June 9, 1886, on the Burlington, Cedar Rapids & Northern, which is now a part of the Rock Island.

Labor Board Decisions

Ruling on Holiday Pay

The Railroad Labor Board has denied the claim of the employees in a case involving the Brotherhood of Railway and Steamship Clerks and the Chicago & Eastern Illinois, in which the employees claimed that they should be paid at the rate of time and one-half for work performed on the day succeeding a holiday when the holiday fell on their assigned day off, this day being other than Sunday. In its opinion the board declared that the rule in question is clear and provides punitive compensation for services performed on the assigned day of rest or the seven specified holidays and does not require such payment under any circumstances on any other day.—*Decision No. 3631.*

Claim for Property Loss

The Railroad Labor Board has dismissed a case involving the Order of Railway Conductors, the Brotherhood of Railroad Trainmen and the Chicago & North Western in which a yardman on the Northern Wisconsin division asked reimbursement on account of the loss of clothing destroyed by fire when a yardmen's shanty burned. The shanty which burned contained lockers in which the yardmen kept some of their working apparel and personal belongings. The Labor Board held that there is no provision in the schedule covering the adjustment of claims for property loss resulting from fires and that the questions should therefore be adjusted by the interested parties themselves.—*Decision No. 3605.*

Use of Telephone by Trainmen

The Railroad Labor Board has denied the claim of the employees of the Chicago & North Western, represented by the Order of Railway Conductors and the Brotherhood of Railroad Trainmen, that being required to use the telephone is in violation of the schedule in effect. Under the rules, the conductor of a train upon arrival at a closed telephone station where a train is to be met or passed, must immediately communicate with the train dispatcher and report the arrival of his train, giving his name, number of train or engine, and the name of station or siding. The Labor Board upheld the position of the North Western that reporting their arrival as a closed telephone station is not requiring of trainmen the performance of operators' duties.—*Decision No. 3622.*

THE AMERICAN SOCIETY OF CIVIL ENGINEERS will hold its summer meeting at Salt Lake City, Utah, on July 8-10, with the Hotel Utah as convention headquarters. The program will be devoted principally to a study of irrigation problems, and papers on various phases of this subject will be presented by government officers and others.

THE TRAFFIC CLUB of Pittsburgh (Pa.) held its annual meeting and dinner on June 8. The election of officers for the ensuing year resulted in the choice of the following: President, W. F. Morris, Jr., Weirton Steel Co.; secretary, Almer H. Orr, Atlantic Coast Line Railroad; treasurer, S. B. Duff, National Tube Co.; governors—D. L. Wells, J. L. Neely, W. P. Buffington, L. G. Hults and W. J. Herman.

Foreign Railway News

Belgian Capital Plans Construction

of Railway in Greece

The Belgian National Bank is negotiating with the Greek government regarding the construction of a new railway, according to a dispatch to the Wall Street Journal. The bank would advance the necessary funds on credit and all construction materials and equipment would be supplied by Belgian manufacturers.

Motor Bus Service Affects Norwegian Railways

During the past few years the Norwegian State Railways have reduced the number of their employees by from 5,000 to 6,000. This reduction has been due to keen competition from motor buses, and as a result it has been decided to confine new construction and improvements to the main lines, leaving the buses to take care of the traffic in sparsely populated country districts. Further reductions in personnel are planned.

Ottoman Concession Once More

Controlled by Chester

Directors of the Ottoman American Development Company have adopted a resolution formally vesting the management and control of the company in Admiral Colby M. Chester, original holder of the concession in Turkey bearing his name, and in his sons, Colby M. Chester, Jr., and Commander Arthur Chester. The action represents the culmination of the controversy within the company which grew out of negotiations looking to the transfer of Admiral Chester's interest in the company to Canadian or British capitalists.

Admiral Chester submitted his own terms, which were accepted. While these were not divulged in detail, it was said the resolution agreed to gave the Admiral and his sons "an absolutely free hand" in working out their plans to carry through the big industrial and railway project in Turkey.

Re-establishment of German Fast Freight Schedules

After the armistice and during the economic depression following the German railway system was handicapped in operation by poor fuel as well as by lack of motive power and rolling stock, which rendered it incapable of restoring long distance fast-freight traffic to anything like its pre-war status, according to Vice Consul C. E. Macy at Coblenz. Before the war, for example, the fast freight schedule between Cologne and Berlin was 20 hours; since the armistice it has taken from 28 to 30 hours for the same trip. Conditions are now so improved, however, that with the new schedule, effective June 1, several fast freights with a scheduled speed of 37 miles an hour are to be restored.

The new services will include the following: Cologne—Berlin, three trains in each direction with a schedule of 15 hours, as against 28 to 30 hours at present. Two of these trains will be routed via Duisburg—Dortmund—Hanover and one via Elberfeld—Soest—Magdeburg; Cologne—Hamburg, via Duisburg—Wanne—Osnabrück—Bremen, one train in each direction, daily, on a schedule of 12 to 15 hours, as against 27 to 28 hours at present; Cologne—Mainz—Frankfort—Darmstadt, via left bank of the Rhine, with connections at Darmstadt for Baden, Wurttemburg, Basel, and Bavaria (via Aschaffenburg), two trains a day in each direction, with a schedule of 5½ hours between Cologne and Mainz and 8 hours between Cologne, Frankfort-on-the-Main, and Darmstadt. The present schedule averages 10 to 12 hours between Cologne and Mainz only.

Improvements in the handling of short-haul traffic also are planned. Facilities for forwarding fast freight from all stations at least twice a day are to be provided, and delays through re-handling are to be avoided, so far as possible, by the use of through cars. A new fast freight is to be put on between Cologne and Trier, via Euskirchen, as well as between Cologne—Niederlahnstein—Frankfort (right bank of the Rhine), Munich—Goldbach (Aachen)—Kaldenkirchen, Cleve—Crefeld—Duisburg—Essen—Dortmund, and Neuss—Dusseldorf—Elberfeld—Hagen.

Equipment and Supplies

Locomotives

THE PARACATU E. DE F., Brazil, has ordered 2 Mikado type locomotives from the Baldwin Locomotive Works.

THE TEXAS COMPANY has ordered one six-wheel switching locomotive from the Baldwin Locomotive Works.

THE SOUTHERN PACIFIC has authorized the construction of 10 six-wheel switching locomotives and 10, 5,200 gal. cylindrical tenders; this equipment will be built in the general shops of the Southern Pacific lines at Houston, Tex.

Freight Cars

THE CARNEGIE STEEL COMPANY is inquiring for prices on the repair of 400 hopper cars.

THE ANDREWS ASPHALT PAVING COMPANY is inquiring for one flat car of 50 tons' capacity.

THE CZARNIKOW-RIONDA COMPANY, New York, is inquiring for 30 cane cars of 30 tons' capacity.

THE MISSOURI-KANSAS-TEXAS has made arrangements to have 300 freight cars repaired at Galveston, Tex.

THE WESTERN PAPER MAKERS' CHEMICAL COMPANY has ordered two 50-ton tank cars from the Standard Tank Car Company.

THE VIRGINIA SMELTING COMPANY, Boston, Mass., has ordered from the American Car & Foundry Company one tank car with 30-ton truck and 20-ton tank, for carrying sulphuric dioxide.

THE HOOKER ELECTRO CHEMICAL COMPANY, Niagara Falls, N. Y., has ordered from the American Car & Foundry Company 5 tank cars with 30-ton trucks and 15-ton tanks, for carrying liquid chlorine.

THE GREAT NORTHERN is now inquiring for 200 steel underframes for 50-ft. flat cars of 50 tons' capacity, and for 1,000 steel underframes for 50-ft. automobile cars of 40 tons' capacity. This is in addition to the inquiry for 1,000 steel underframes for 40-ft. box cars of 40 tons' capacity reported in the *Railway Age* of June 13.

Passenger Cars

THE PENNSYLVANIA RAILROAD has ordered 3 gas-electric cars from The J. G. Brill Company.

THE NATIONAL RAILWAYS OF MEXICO are inquiring for 6 first class steel coaches and 10 second class steel coaches.

THE KANSAS CITY, MEXICO & ORIENT has ordered 3 gasoline rail motor cars and 2 trailer cars from The J. G. Brill Company.

THE COLORADO & SOUTHERN has ordered one Model 25 twin engine combination passenger and baggage motor car, from the Edwards Railway Motor Car Company.

THE BUTLER COUNTY RAILROAD has ordered one Model 20 single engine combination passenger and baggage motor car, from the Edwards Railway Motor Car Company.

THE MARION & RYE VALLEY RAILWAY has ordered one Model 25 combination passenger and baggage twin engine gasoline motor car, from the Edwards Railway Motor Car Company.

Iron and Steel

THE NORTHERN PACIFIC is inquiring for 500 tons of spikes and 1,000 kegs of bolts.

THE ATLANTIC COAST LINE has received bids for 600 tons of steel for a viaduct.

THE NEW CENTRAL is inquiring for 400 tons of steel for making repairs to bridges.

THE MISSOURI-KANSAS-TEXAS has ordered 1,000 tons of tie plates from the Scullin Steel Company.

THE PENNSYLVANIA has ordered 1,700 tons of steel for bridge work from the Phoenix Bridge Company.

THE CHICAGO & WESTERN INDIANA has ordered 1,950 tons of structural steel from the McClintic-Marshall Co.

THE CHESAPEAKE & OHIO has ordered 950 tons of structural steel for use in Russell, Ky., from the Moss Iron Works.

THE NORTHERN PACIFIC has ordered 1,400 tons of structural steel for ore docks at Allouez, Minn., from the American Bridge Company.

Signaling

THE TEXAS & NEW ORLEANS (S. P.) has ordered from the Union Switch & Signal Company, a mechanical interlocking, 12 levers for Port Arthur, Tex., the crossing of the Texarkana & Fort Smith (K. C. S.).

THE MICHIGAN CENTRAL has contracted with the Continuous Train Control Corporation, New York and Detroit, for a trial installation of its semi-continuous automatic train control of the inductive type, using Hertzian waves, on its main line between Jackson, Mich., and Albion, 20 miles, double track. The system will be the simple stop with two-position cab indication. Ten locomotives are to be equipped, five freight and five passenger. The locomotive equipment employs different wave lengths for each indication, and works through a gap of from 8 in. to 10 in.

THE ATCHISON, TOPEKA & SANTA FE has ordered D. C. block signaling materials from the Union Switch & Signal Company involving T-2 semaphore signals and attendant apparatus for installation on various sections of the Santa Fe, as follows:

Stewart Ave., Chicago, to Corwith, Ill.....	Eastern lines
4.7 miles double track.	
Medill to Bucklin, Mc.....	Eastern lines
78.4 miles double track.	
Rothville to Standish, Mo.....	Eastern lines
27.5 miles double track.	
Ridgton to Neosho Rapids, Kansas.....	Eastern lines
14 miles double track.	
Spencer to Pauline, Kans.....	Eastern lines
14.2 miles single track.	
Springer to Shoemaker, N. M.....	Western lines
42.9 miles single track.	
Watrous to Las Vegas, N. M.....	Western lines
19.9 miles single track.	
Ardmore to Thackerville, Okla.....	Gulf lines
27.4 miles single track.	
Cleburne to Meridian, Texas.....	Gulf lines
37.1 miles single track.	
Shirley to Angiola, Calif.....	Coast lines
31.1 miles single track.	

In addition to the above the Santa Fe is also ordering Style R color light signals for installation on three miles of single track from the Coast Lines, between Fallbrook Junction and Escondido Junction, Cal., on which section alternating current blocking will be installed. All of the materials for the above work are being furnished by the Union Switch & Signal Company, and will be installed by the railroad company's construction forces.

Passenger Cars Ordered, Installed, Retired

Quarter	Domestic orders reported during quarter	No. installed during quarter	No. retired from service during quarter	No. owned or leased at end of quarter	No. under order or being constructed
Full year, 1923.....	2,214*	2,719	2,713		
1924					
Jan.-March	559	699	431	54,519	970
April-June	263	698	552	54,668	847
July-September	563	668	544	54,783	791
Oct.-December	338	759	849	54,787	651
Full year, 1924.....	2,554*	2,824	2,376		
1925					
Jan.-March	279	609	589	54,594	773

(1) Details as to orders from *Railway Age* weekly reports. Figures include all domestic orders placed with builders and railroad shops.

(2) Figures in remaining columns from Car Service Division, A. R. A. quarterly report of passenger cars, Form C. S. 55 A. Figures cover only Class I roads reporting to Car Service Division and are not therefore strictly comparable with figures given in first two columns of table.

* Corrected figures.

Supply Trade News

The Central Steel Company, Massillon, Ohio, has opened a branch office in Los Angeles, Cal.

The Griffin Wheel Company, Chicago, has prepared plans for the construction of an additional plant at Salt Lake City, Utah.

The Morton Manufacturing Company has appointed the Peden Iron & Steel Company, Houston, Texas, and San Antonio, its southwestern representative.

The Achuff Railway Supply Company has been incorporated in St. Louis, Mo., to manufacture railway supplies. The incorporators are J. B. Black and W. D. Achuff.

P. G. Kennett, whose appointment as manager of railway sales, with headquarters in Chicago and New York, of the E. I. du Pont de Nemours & Company, Wilmington, Del., was announced in the *Railway Age* of June 13, was born in St. Louis, Mo., on February 22, 1875. He attended Staunton Military Academy, Staunton, Va., and the Christian Brothers College, St. Louis, Mo. Mr. Kennett entered railway service in the stores department of a southern road and later was employed in the stores and purchasing departments of several railroads in the south and southwest. He entered the employ of the Flint Varnish Works, Flint, Mich., in 1910 as a salesman, which position he held until October, 1918, when the du Pont Company acquired the Flint Varnish Works. He continued as a salesman for the du Pont Company at Flint, Mich., until May, 1920, when the Chicago Varnish Company was acquired and he was transferred to Chicago. In December, 1921, he was promoted to sales manager of railway sales of the Chicago district and in April, 1922, he was appointed sales manager of railway and industrial sales of the Chicago district, which position he has held until his recent appointment.

Emmet K. Conneely, vice-president and manager of sales of the New York Air Brake Company, at New York, has been elected also a member of the board of directors.

The Hattiesburg Creasoting Company has changed its name to the Gulf States Creosoting Company. The company recently completed a new plant at Meridian, Miss. It also has plants at Hattiesburg, Miss., and at Slidell, La.

George A. Muir, formerly representative of the Allis-Chalmers Manufacturing Company, with headquarters at Denver, Colo., has been elected president and manager of the Advance Machinery & Supply Company, Denver.

W. W. Ballew, electric railway specialist at Atlanta, Ga., of the Westinghouse Electric & Manufacturing Co., has been promoted to division manager in the state of Georgia, with headquarters in the Westinghouse building, 426 Mariette street, Atlanta.

The Safety Car Heating & Lighting Company, New York has entered into an agreement with the Silica Gel Corpora-

tion, Baltimore, Md., for the development under exclusive license, of apparatus for use by railroads and other transportation refrigeration generally. The Safety Car Heating & Lighting Company's engineers, after investigation have decided that the use of Silica Gel for refrigeration is sound and gives promise of extended use.

J. W. Hubbard, of Pittsburgh, Pa., has purchased the controlling interest in the Detroit Seamless Steel Tubes Company, Detroit, Mich., and has been elected chairman of the board of directors. A. A. Templeton, formerly president and general manager, having disposed of his interest in the company, has been succeeded by C. H. Hobbs, who has been vice-president since January, 1922. There will be no other changes in the officers of the company or in the general policies under which it operates.

Heman Ely, vice-president and treasurer of the Timken Roller Bearing Company, Canton, Ohio, has retired from active connection with the company. Mr. Ely became associated with the Timken Company in 1909 as secretary; in 1916 he was also appointed treasurer, and since 1920 served as vice-president and treasurer. H. J. Porter, general sales manager has been promoted to vice-president in charge of sales. L. M. Klinedinst, assistant to Mr. Porter, has been appointed general sales manager of the industrial division.

The Monongahela Iron & Steel Company, Pittsburgh, Pa., whose product has heretofore been confined to low phosphorus melting bar and muck bar, has installed mills and other equipment for the manufacture of staybolt, engine bolt and other high grade irons made exclusively from hand puddled muck bar. This company is the successor of the old Carter Iron Company which operated plants at Hays Station, Pennsylvania, Paden City, West Virginia, and Ivanhoe, Virginia. The present operations will be concentrated at Paden City, with general offices at 2208 First National Bank building, Pittsburgh, Pa.

Charles N. Ring, until recently works manager of the Allied Steel Castings Company, Harvey, Ill., has been appointed assistant director of the Electric Steel Founders' Research Group, succeeding W. J. Corbett, who resigned to become secretary-manager of the Steel Founders' Society of America. Mr. Ring has had more than fifteen years' experience in steel casting manufacture, following his education at Washington University and the University of Missouri. At various times he was connected with the American Steel Foundries, the Commonwealth Steel Company, the Illinois Steel Company, the Laclede Steel Company and the Ohio Steel Foundry, prior to his connection with the Allied Steel Castings Company. R. A. Bull is the director of the Electric Steel Founders' Research Group and the companies of which the group is composed are: Fort Pitt Steel Casting Company, McKeesport, Pa.; Lebanon Steel Foundry, Lebanon, Pa.; Michigan Steel Casting Company, Detroit, Mich.; Nugent Steel Castings Company, Chicago, Ill., and Sivyer Steel Casting Company, Milwaukee, Wis.

The U. S. Light & Heat Corporation, Niagara Falls, N. Y., announces the transfer of H. A. Matthews, vice-president of the railway sales division to resident vice-president at Detroit. This does not conflict with the company's present Detroit district organization, of which W. W. Pennington is the sales manager. J. A. White, vice-president, sales manufacturers' division, will personally supervise the sale of USL storage batteries to railroads with R. J. Stanton, sales engineer, formerly assistant to H. A. Matthews, in direct charge. J. L. Fosnight, sales manager, arc welder division, will handle the sale of USL electric arc welders to railroads and industrial companies. A. W. Donop, district sales manager, Chicago, will have charge of sales on batteries to railroads in the Chicago territory, vice H. A. Morrison, resigned. The railway sales office at 1404 Railway Exchange will be discontinued by consolidation with the battery sales office at 2001 West Pershing road. W. W. Halsey will continue as district sales manager of the New York office, which was recently removed from the Grand Central Terminal to 161 West Sixty-fourth street.



P. G. Kennett

Standard Tank Car Company

The board of directors of the Standard Tank Car Company has been reconstituted in accordance with a plan of readjustment adopted last February and other details of the plan have been completed to the point that preferred stockholders can now make the exchange of stock which was provided for by the plan, according to a statement made by Grayson M. P. Murphy, chairman of the board of directors.

The board as now constituted consists of: James Andrews, vice-president and general manager; Walter P. Chrysler, chairman of the board of the Maxwell Motor Corporation; William F. Cutler, president of the Southern Wheel Company; Duncan A. Holmes, vice-president of the Chase Securities Company; Stewart McDonald, president of the Moon Motor Car Company; Grayson M. P. Murphy, chairman of the board; J. B. Orr, president; Samuel F. Pryor, chairman of the executive committee, Remington Arms Company; and Ernest Stauffen, Jr., vice-president of the New York Trust Company.

The company's operating organization has been strengthened by the election of James Andrews as vice-president and general manager, and of Harry Graham, as vice-president in charge of sales and operation, as was reported in the *Railway Age* of June 6. Substantial progress has been made by the company in the matter of new business and on June 1, the company opened an office at Tulsa, Okla., with F. S. Thompson in charge.

Under the terms of the plan of readjustment, preferred stockholders have the right to receive one share of new first preferred stock and one and two-thirds shares of common stock for each two shares of preferred stock now held. This exchange may be made at the Union Trust Company of Pittsburgh. In connection with the recent sale of the company of \$4,250,000 of National Steel Car Line's equipment trust certificates, which was also a part of the financing under the plan, the Standard Transit Company was organized to take over the tank line business and the 2,757 tank cars formerly operated by the Tank Car Company, which are leased principally to the large oil companies. The directors of the Standard Tank Car Company will also serve as directors of the Standard Transit Company. The Standard Tank Car Company has an office at Sharon, Pa., and its plant is located at Masury, Ohio, 12 miles from Youngstown.

Obituary

A. J. Jones, secretary and general manager of the Acme Machine Tool Company, Cincinnati, Ohio, died on May 31.

Bert W. Peirce, sales representative of Joseph T. Ryerson & Sons, Inc., with headquarters in Chicago, died on June 4 following an attack of appendicitis.

H. Englebright, who retired as master car repairer of the Southern Pacific in August, 1922, after a continuous service of 52 years with that road, died on June 5 at his home in Oakland, Cal., at the age of 73. Mr. Englebright entered the service of the old California Pacific as a blacksmith apprentice in 1869 and worked at this trade at various points until 1892, when he was appointed roundhouse and car foreman at Fresno, Cal. In 1898 he became general car foreman at San Francisco and in 1900 master car repairer at Oakland, which position he held until his retirement in 1922.

Trade Publications

THE FOGARTY DIGGING BUCKET.—The McMyler Interstate Company has issued a four-page leaflet describing this bucket, which this company has recently taken over and which is adapted particularly for trench work and, in the larger sizes, for river and harbor dredging. This leaflet describes the bucket and the character of work for which it is particularly adapted. It also contains a sketch, with the essential dimensions.

RECLAIMING SCRAP CAR AXLES.—The reclaiming of scrap car axles as practiced by a middle western railroad shop is described in an eight-page illustrated circular recently issued by the Ajax Manufacturing Company, Euclid, Ohio. The railroad referred to makes it a practice to centralize at one point and reclaim every scrap axle available from the entire system, the needs of the road with practically all except the largest size axles being supplied from this source.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—The Employees Hospital Association has awarded a contract to C. A. Fellows & Company for an addition to the employees hospital at San Bernardino, California.

ATCHISON, TOPEKA & SANTA FE.—This company has given a subcontract for the grading of a new line from Doud, Tex., 65 miles west to the Texas-New Mexico state line to the R. & P. Construction Company, Houston, Tex. The subcontract for the construction of stations, section houses and other buildings on this line has been awarded to G. M. Leaverton, Lubbock, Tex. As reported in the *Railway Age* of May 16, the general contract for the construction of this line was awarded to Sharp & Fellows, Los Angeles, Cal.

ATCHISON, TOPEKA & SANTA FE.—A contract has been awarded to the T. S. Leake Construction Company, Chicago, covering the construction of a two-story office building, 36 ft. by 50 ft., and a one-story warehouse, 50 by 300 feet, in Chicago. A contract has also been awarded to Sprague & Nicely for the construction of 58 miles of line, west of Elkhart, Kan. Sharpe & Fellows, who have been awarded the general contract, have sublet the construction of stations, section houses, agents residences and stockyards on the Atchison, Topeka & Santa Fe line being built from Dowd, New Mexico, to N. D. Leaverton, Lubbock, Tex. This company also sublet a contract to Roberts & Prentice Construction Company covering grading and construction of 70 miles of line between Lubbock, Texas, and Dowd, New Mexico.

BALTIMORE & OHIO.—A contract has been awarded to the Construction Company, Chicago, covering the erection of the superstructure of a bridge crossing the Cheat river at Point Marion, Pa. The new structure contains six through spans varying in length from 85 to 134 ft., and the weight of steel-work involved is approximately 1,000 tons. Another contract placed by the same road with Pittsburgh Construction Company, Pittsburgh, Pa., covers the remodeling of superstructure in the bridge crossing Pine creek, at Etna, Pa., involving about 110 tons of steelwork.

CHICAGO, BURLINGTON & QUINCY.—This company is accepting bids for the construction of a brick power house 50 by 96 feet, and the moving and resetting of four boilers at Galesburg, Ill.

CHICAGO, MILWAUKEE & ST. PAUL.—This company has awarded a contract for H. C. Strucken, St. Paul, Minn., for general building work including an engine house, shops, power house and foundation for other structures for its engine terminal at St. Paul, Minn. A contract has been let to the Ogle Construction Company for a coaling station, to the McCarty Well Company for a well, to the Pittsburgh Bridge & Iron Company for a tank, to Smith & Chabot for foundation pile driving, and to Peterson, Shirley & Gunther for grading.

CHICAGO, ROCK ISLAND & PACIFIC.—The following improvements have been authorized in addition to those reported in the *Railway Age* of February 28. Approximately \$1,000,000 will be spent in the construction of 13 coaling stations, 18 water treating plants, 11 wash-out plants and 22 cinder conveyors. The coaling stations will be erected at Washington, Iowa, Council Bluffs, Marengo, and other points. A new passenger station is to be constructed at Tucumcari, New Mex., which, with other improvements on the El Paso division, will cost \$310,000. The construction of 42 miles of second track from Latimer, Kan., to McFarland, at an estimated cost of \$3,700,000, has now been definitely authorized as has the construction of a branch line from Billings, Okla., to Ponca City to cost \$990,000.

ILLINOIS CENTRAL.—This company is asking for bids for a brick and steel roundhouse and machine shop and a number of small shops at Sioux City, Ia. A contract has been awarded to Coomer & Small for foundations.

ILLINOIS CENTRAL.—This company has awarded a contract to the Railroad Water & Coal Handling Company, Chicago, for the construction of a water treating plant and pumping station having a capacity of 50,000 gallons per hour at Harvey, Illinois.

KANSAS CITY SOUTHERN.—Company forces are making some minor changes in the mechanical facilities at Port Arthur, Tex. Some additions to the elevator at Port Arthur are contemplated, but this work has been postponed. The widespread report that the construction of car and locomotive shops is planned is erroneous.

LOUISVILLE & NASHVILLE.—This company, in conjunction with the Nashville, Chattanooga & St. Louis, contemplates the construction of a union passenger station at McKenzie, Tennessee.

MISSISSIPPI & SCHOONA VALLEY.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line from Bryant to Bruce, Miss., 22 miles, to be operated in conjunction with the Illinois Central.

MISSOURI-KANSAS-TEXAS.—The construction of a six-story reinforced concrete and steel warehouse at Houston, Tex., is contemplated.

MISSOURI PACIFIC.—Bids are being accepted for a 6-stall roundhouse at Bush, Ill.

MISSOURI PACIFIC.—A contract has been awarded to Jerome A. Morse, Chicago, for the construction of an 8-stall roundhouse at Osawatomie, Kan.

NAPLES, SEABOARD & GULF.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a line to be operated by the Seaboard Air Line from Naples, Fla., to Fort Myers and the south bank of the Estero river, 35 miles.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—The construction of a passenger station at Murray, Ky., is contemplated.

PACIFIC ELECTRIC.—This company will construct a passenger station near Los Angeles, on the Venice Beach line, to cost approximately \$25,000.

PENNSYLVANIA.—The following contracts have been awarded: For paving Buckins street, Philadelphia, to Ralph V. Rulon, Philadelphia. For the erection of a brick chimney for power house at Stony Creek, Chester, Pa., to Alphonse Custodis Chimney Company, Philadelphia.

For construction of overhead bridge to carry White Horse turnpike over the company's lines at Ancora, N. J., to T. J. Foley Company, Philadelphia, \$25,000.

For the superstructure for a bridge to carry the company's lines over the Chesapeake & Delaware Canal at Canal, Del., to the Phoenix Bridge Company, Phoenixville, Pa., \$300,000.

QUINCY & NORTHEAST (ELECTRIC).—This company has filed incorporation papers with the recorder of deeds at Quincy, Ill. Articles list the capital at \$1,200,000, and directs the use of steam, electricity or other motive power for fifty years. The proposed line is to run from Quincy, Ill., to Monmouth, approximately 70 miles.

SOUTHERN PACIFIC.—The Railroad Commission of California having granted permission for the Southern Pacific to lease the 16½-mile narrow gage line of the Lake Tahoe Railroad & Navigation Company, the work of reconstructing the short line as a standard gage railroad will be undertaken soon.

SOUTHERN PACIFIC.—The Interstate Commerce Commission has issued a certificate of public convenience and necessity authorizing this company to construct an extension of its Sutter Basin branch for a distance of 5.6 miles from a point near Hinsdale, Calif., in a northeasterly direction. The cost of the construction is estimated at \$331,054. The line will reach a rich agricultural area.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—The Circuit Court at St. Louis has authorized this company to proceed with the condemnation of land in the vicinity of the union station on which storage tracks with a capacity of 700 cars will be constructed.

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ATCHISON, TOPEKA & SANTA FE.—*Acquisition.*—This company has applied to the Interstate Commerce Commission for authority to acquire control of the Gulf & Northern by purchase of stock.

AUGUSTA SOUTHERN.—*Final Valuation.*—The Interstate Commerce Commission has issued a final valuation report as of June 30, 1916, in which the final value for rate-making purposes of the property owned and used for carrier purposes is placed at \$919,976.

BUFFALO, BRADFORD & PITTSBURGH.—*Abandonment of Line.*—The Interstate Commerce Commission has granted authority to the Buffalo, Bradford & Pittsburgh and the Erie, which made a joint application relative thereto, for the abandonment of the Alton branch of the former company extending from a connection with the Bradford division of the Erie at Crawford Junction, Pa., to Alton, 1.95 miles.

BUFFALO, ROCHESTER & PITTSBURGH.—*Acquisition.*—The Interstate Commerce Commission has authorized the Allegheny & Western to acquire and the Buffalo, Rochester & Pittsburgh to operate the line of the Rural Valley extending from Echo, Pa., to Margaret Mine, 8.1 miles with a branch from Yatesboro to Nu Mine, 3.6 miles. The Rural Valley is at present owned by a coal company. The commission also authorized the Buffalo, Rochester & Pittsburgh to acquire control by lease of the Rural Valley, upon the acquisition thereof by the Allegheny & Western, the matter to be covered by the lease of the Allegheny & Western by the Buffalo, Rochester & Pittsburgh which was effected in 1898.

BURLINGTON, MUSCATINE & NORTHWESTERN.—*Articles of Incorporation.*—Articles of incorporation have been filed for this road to succeed the Muscatine, Burlington & Southern, the operation of which was discontinued on June 13, 1924. The road was purchased at a receiver's sale by E. L. Tobie, Monmouth, Ill.

CANADIAN PACIFIC.—*New Director.* Col. Henry Cockshutt, lieutenant-governor of Ontario, has been elected a director to fill the vacancy caused by the death of Sir Edmund Osler.

CAROLINA WESTERN.—*Stock.*—The Interstate Commerce Commission has granted authority for the issuance of \$50,000 capital stock for the purpose of acquiring the line formerly operated by the Camp Manufacturing Company in Berkeley County, S. C., 6 miles. The road has been operated by the Carolina Western since April 3, 1924, and the commission's authority relative thereto was reported in the *Railway Age* of June 13.

CHICAGO, MILWAUKEE & ST. PAUL.—*Opposition to Reorganization Plan.*—Opponents of the reorganization plan of the Chicago, Milwaukee & St. Paul are reported to be negotiating with Charles Evans Hughes, formerly secretary of state, with a view to retaining him as counsel at the hearings on the affairs of that carrier before Commissioner Cox of the Interstate Commerce Commission which are to begin at Atlantic City on July 1. It is reported that he will appear in behalf of Roosevelt & Son, New York financial house, which recently advertised its opposition to the reorganization, until such time as the present rate structure in the northwestern region should be corrected. Roosevelt & Son are expected to issue shortly a detailed analysis dealing with the proposed reorganization.

Opposition to the plan has been offered by various insurance companies, including the Globe & Rutgers Fire Insurance Company, the Pacific Fire Insurance Company, the Stuyvesant Insurance Company and the Hamilton Fire Insurance Company, and also by J. D. Shatford, representing the American Railroad Owners Association.

Edwin C. Jameson, president of the Globe & Rutgers Fire Insurance Company, has announced that work is progressing on the preparation of a new reorganization plan for the railroad. The announcement said that the new plan "will afford reasonable protection to the stockholders and to the junior lien bonds without

the payment of exorbitant commissions to reorganization managers."

Questions Advisability of Paying Government Loans.—The following was recently issued by the firm of Hayden Stone & Co.:

"Although there has been a tendency to command the expedition with which plans for a reorganization have been formulated," the letter says in part, "this attitude will not appeal to coldblooded statistical analysis. In fact, the unusual speed with which it is sought to effectively bring to a conclusion a sudden receivership might better be characterized as unseemly haste. The first essential to intelligent reorganization of any business is a reasonably correct estimate of future earning power. With the compensation which the St. Paul will in the future receive for its services an undetermined matter, this cannot now be arrived at to an extent which should satisfy vitally affected security holders. The only certain facts are that the road is entitled to much better rates, that upward revisions are now pending and appear fairly imminent, and that even a slight betterment in this matter will effect a vital change in St. Paul's future earnings."

"The energies of the St. Paul plan are absorbed in the liquidation of the government loan. We feel that the intent of the plan is clear but do not understand its purpose. The principle of the government's entrance into private finance is one of assistance. The smaller portion of this loan does not fall due until 1927, the larger until 1930. It should be possible to effect a long term extension. Congress in its last session gave clear indication of a desire and intent to render aid in the matter of reducing interest charges."

Potter Favors Plan.—Mark W. Potter, former Interstate Commerce Commissioner and now one of the three receivers for the St. Paul, has been quoted as follows:

"Before this proposal was put forward I was of the belief that it might be well to mark time for a while in this affair. I leaned, in other words, toward the opinion of some of those who are now opposing the reorganization. Since I have seen and studied the plan, however—and I have made quite an intensive study of it during the last few days—I have been completely won over. The bankers' proposals will stand scrutiny, it seems to me, from any angle. They fit in perfectly with the results of the study of the St. Paul situation made by the engineers and not only take into consideration the immediate difficulties of the system but take cognizance of the entire picture as it is drawn by that report, present and future combined."

Engineers Report Filed.—The firm of Coverdale & Colpitts filed its report with Judge Wilkerson of the United States District Court at Chicago on June 10.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—Bonds.—The Interstate Commerce Commission has granted authority to procure the authentication and delivery of \$1,021,000 first and general mortgage 6 per cent bonds, series B, and to pledge and repledge them from time to time to June 30, 1927 as collateral security for short term notes.

CHICAGO, ROCK ISLAND & PACIFIC.—Control of Cotton Belt Opposed.—The Interstate Commerce Commission has granted leave to the St. Louis-San Francisco to intervene in the proceeding in which this company has applied for authority to acquire control of the St. Louis Southwestern. The Frisco in its petition said that such acquisition would not be in the public interest and that it would be in violation of section 5 of the interstate commerce act, which requires the commission to preserve as fully as possible competition between carriers and existing routes and channels of trade and commerce, as well as in conflict with the commission's tentative consolidation plan. Hearing on the application was begun before Examiner H. C. Davis at Washington, on June 15.

J. R. Koontz, traffic vice-president of the Frisco testified at the hearing in opposition to the granting of the application, saying the commission had prevented the Frisco from acquiring control of the International-Great Northern because it was not in accordance with the tentative plan, and that the Frisco would like to acquire control of the Cotton Belt itself. L. C. Fritch and S. H. Johnson, vice-presidents of the Rock Island, testified as to the operating and traffic advantages to be derived from acquisition of the Cotton Belt. M. L. Bell, vice-president and general counsel of the Rock Island, said that the stock of the Cotton Belt had been acquired because it would strengthen the Rock Island system and that the action had not been in any way inspired by the Southern Pacific, but that if the Southern Pacific and Rock Island were to be joined, as proposed in the tentative plan, the system would be strengthened by the inclusion of the Cotton Belt.

DELAWARE, LACKAWANNA & WESTERN.—Merger of Former Coal Properties.—A special meeting of the stockholders of the Glen Alden Coal Company has been called for August 10 to vote on recommendation of the directors that the capital stock be increased from 846,000 shares to 1,168,693 shares and that one share be offered for each share of the outstanding capital stock of the Delaware, Lackawanna & Western Coal Company. The Glen

Alden Coal Company operates the Lackawanna's former coal properties. The D. L. & W. Coal Company is a sales company. The sales company was organized in 1909 and the Glen Alden Coal Company in 1921. The Lackawanna still holds \$60,000,000 Glen Alden 4 per cent bonds.

DENVER, RIO GRANDE & WESTERN.—1924 Earnings.—Annual report for 1924 shows a deficit after allowance for interest charges of \$3,604,719 as compared with a deficit of \$2,854,910 in 1923. Selected items from the income statement follow:

	DENVER & RIO GRANDE WESTERN		
	1924	1923	Increase or decrease
Railway operating revenues.....	\$33,011,558	\$34,587,497	-\$1,575,939
Maintenance of way.....	\$6,128,433	\$5,534,640	\$593,793
Maintenance of equipment.....	9,151,008	9,653,292	-502,284
Transportation	11,378,447	12,698,471	-1,320,024
Total operating expenses.....	\$28,591,457	\$30,030,669	-\$1,439,213
Net revenue from operations.....	\$4,420,101	\$4,556,827	-\$136,726
Railway tax accruals.....	1,986,336	1,885,130	101,206
Railway operating income.....	\$2,423,929	\$2,663,560	-\$239,631
Net railway operating income.....		(Not shown)	
Total non-operating income.....	\$2,282,576	\$2,754,184	-\$471,609
Gross income	\$4,706,504	\$5,417,744	-\$711,240
Rent for leased roads.....	\$413,223	\$447,212	\$33,990
*Interest on funded debt.....	5,321,926	4,974,658	347,268
Total deductions from gross income.....	\$8,311,223	\$8,272,654	\$38,569
Net income, deficit.....	\$3,604,719	\$2,854,910	\$749,809
Disposition of net income:			
*Income applied to sinking fund.....	\$253,065	\$261,500	-\$8,435
Income applied to redemption of equipment, Trust Series "A"	310,000	240,000	70,000
Total appropriations	\$563,065	\$501,500	\$61,565
Surplus for year carried to debit of profit and loss.....	\$4,167,783	\$3,356,410	-\$811,374

* Includes interest accrued and appropriations on first and refunding and adjustment mortgage bonds to December 20, 1924.

DETROIT & IRONTON.—Bond Issue.—The Interstate Commerce Commission has modified its order of August 1, 1924, to permit a second modification in the terms of the series A, 5 per cent first mortgage bonds amounting to \$7,500,000 to be issued in connection with the construction of line between Malinta, Ohio, and Durban, Mich. The bonds have not yet been issued.

ERIE.—Annual Meeting Again Adjourned.—The annual meeting of the stockholders of the Erie was adjourned again on June 16 to October 15. The meeting was first adjourned on April 15, pending development in the Nickel Plate unification plan hearings which are now being held by the Interstate Commerce Commission.

GREAT NORTHERN.—Six Months' Guaranty Overpaid.—The Interstate Commerce Commission has determined the amount of this company's guaranty for the six months' period following the termination of federal control as \$11,178,887, but as partial advance payments amounted to more than this it finds that the company now owes the government \$1,321,112.

GREAT NORTHERN.—Stock.—This company has applied to the Interstate Commerce Commission for authority to issue \$250,000 of preferred stock, the proceeds to be used in constructing an extension from Scobey, Mont., to Opheim, 50 miles. It is stated that it is expected that the stock will be subscribed by farmers and other inhabitants of the territory at par.

Western Fruit Express Equipment Trusts.—The Interstate Commerce Commission has authorized the Great Northern to assume obligation and liability as guarantor, jointly and severally, with the Western Fruit Express Company in respect of \$1,155,000 Western Fruit Express Company equipment trust certificates of 1925 series C, paying 4½ per cent, to be issued by the First National Bank of New York. The trust covers 960 cars which are to be rebuilt and which, after rebuilding, are estimated to represent an investment of approximately \$2,079,346 or \$2,166 per car. The certificates are to be dated June 1, 1925, and mature serially on June 1 each year from 1926 to 1940 inclusive. The sales of certificates have been contracted for at an average price of 96.427. On that basis the average annual cost would be approximately 5.04 per cent. The commission authorized the assumption and obligation of liability upon condition that they be sold at an average price of

not less than 96.89 and accrued dividends, at which price the average annual cost would be approximately 5 per cent.

Commissioner Eastman dissented.

GULF, FLORIDA & ALABAMA.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1919, placing the final value for rate-making purposes of the property owned at \$2,445,625 and that of the property used at \$2,363,800.

INTERNATIONAL-GREAT NORTHERN.—1924 Earnings.—The annual report for 1924 shows net income of \$773,413 as compared with \$431,511 in 1923. Selected items from the income statement follow:

	INTERNATIONAL-GREAT NORTHERN		Increase or decrease
	1924	1923	
Average mileage operated.....	1,159.50	1,159.50	.....
Railway operating revenues.....	\$16,901,448	\$15,806,608	\$1,094,840
Maintenance of way.....	\$2,988,936	\$2,965,152	\$23,784
Maintenance of equipment.....	2,999,927	2,742,532	257,395
Transportation.....	6,112,183	5,879,493	232,690
Total operating expenses.....	\$12,955,240	\$12,542,633	\$412,608
Net revenue from operations.....	\$3,946,207	\$3,263,975	\$682,232
Railway tax accruals.....	555,456	485,295	70,161
Railway operating income.....	\$2,571,920	\$2,175,926	\$395,994
Hire of equipment—net debit.....	760,045	555,069	204,976
Joint facility rents—net.....	55,541	47,069	8,472
Non-operating income	\$102,261	\$160,453	-\$58,192
Gross income	\$2,674,181	\$2,336,379	\$337,802
Total deductions from gross income.....	\$29,454	\$41,134	-\$11,679
Balance available for interest, etc.....	\$2,644,727	\$2,295,245	\$349,481
Interest on fixed charge obligations.....	1,191,314	1,183,734	7,580
Balance available for interest on adjustment mortgage bonds	\$1,453,413	\$1,111,511	\$341,901
Interest on adjustment mortgage bonds at 4 per cent.....	680,000	680,000	.....
Balance of income.....	\$773,413	\$431,511	\$341,902

ILLINOIS CENTRAL.—Acquisition of Gulf & Ship Island Approved.—The Interstate Commerce Commission has approved conditionally the acquisition by the Illinois Central through the Mississippi Valley Company of the control of the Gulf & Ship Island by purchase of capital stock. The Gulf & Ship Island operates 308 miles of line extending from a connection with the Illinois Central at Jackson, Miss., to Gulfport, with a semi-circular branch line extending from a connection with the main line at Mendenhall through Columbia to a connection with the main line at Maxie, and another branch from Saratoga to Laurel. The Mississippi Valley Company, a non-operating company, all of the capital stock of which is owned by the Illinois Central, has purchased the entire outstanding capital stock of the Gulf & Ship Island amounting to \$7,013,100 par value, paying therefore \$5,000,000 in notes payable on or before November 17, 1925. The Gulf & Ship Island originates more traffic than it receives from its connections. Over 51 per cent of its traffic in 1924 consisted of products of forests originating on its own lines. Other commodities handled in considerable volume included gravel, acid phosphate and potash.

Opposition to the acquisition of control by the Illinois Central was offered by the Fernwood, Columbia & Gulf, which operates a line between Columbia, Miss., and Fernwood, 44 miles. The commission decided as follows:

It appears that the proposed acquisition of control will result in expedited service, and the project seems to have the united support of the business interests in the territory served. The record indicates an almost unanimous belief that the granting of the authority requested will make possible a large increase in agricultural and manufacturing pursuits, and will materially aid in the development of the gulf coast. However, the public interest in this case seems to require that those shippers on the road of the Fernwood Company, who might be without means of transportation by railroad if the line of that company should cease to operate, should be given such protection as is within our power to afford in this proceeding to assure the continued operation of that line. Our order will therefore be issued upon condition that existing through routes and joint rates shall be preserved and that divisions of joint rates allowed to the Fernwood Company by the Illinois Central and the Gulf & Ship Island shall not be decreased except upon our order. It is alleged, but not proven, upon this record that the granting of this application will result in the ultimate extinction of the Fernwood as a common carrier. However, in order to meet such a possible contingency we will attach the further condition that if the operating revenues of the Fernwood Company shall at any time become insufficient to pay its operating expenses the Illinois Central, upon the request of the Fernwood Company shall establish and maintain reasonable and adequate service over the line of the Fernwood Company, upon such terms and conditions as may be agreed

upon between the parties, until such time as the commission shall, under appropriate proceedings, authorize abandonment of such service on the railroad of the Fernwood Company. If the parties should be unable to agree on the terms and conditions for such operation a supplemental petition may be filed in this proceeding.

JACKSONVILLE & HAVANA.—Acquisition.—This company has applied to the Interstate Commerce Commission for a certificate authorizing it to acquire and operate that part of the line abandoned by the Chicago, Peoria & St. Louis from Jacksonville to Havana, Ill., 41.8 miles.

KANSAS CITY SOUTHERN.—Six Months' Guaranty.—The Interstate Commerce Commission has issued a final certificate placing the amount of this company's guaranty for the six months' period following the termination of federal control at \$962,453, of which \$362,453 was due to be paid on the final certificate.

KANSAS, OKLAHOMA & GULF.—Interstate Commerce Commission to Investigate.—The Interstate Commerce Commission has ordered a proceeding of inquiry and investigation concerning the history, management, financial and other operations, accounts and practices of this company, "in order to determine the manner and method in which the business of said company has been conducted."

New Control.—F. J. Lisman & Co. have purchased \$5,500,000 series C bonds and \$8,600,000 par value of the preferred stock from the Kansas, Oklahoma & Gulf Holding Company, which had issued its bearer stock certificates against the securities. The stock certificates had been held almost entirely in France. The purchase is stated to constitute about 96 per cent of these issues and eliminates the French holdings in the railroad. The Kansas, Oklahoma & Gulf operates a line from Baxter, Miss., via Wagoner, Okla., to Red River, Okla., 301 miles with 13 miles of branches. It was organized in 1919 as a successor company to the Missouri, Oklahoma & Gulf and has been in receivership since June 7, 1924. The company owns all of the capital stock of the Kansas, Oklahoma & Gulf of Texas, operating a total of 9 miles. The company has outstanding \$729,640 common and \$9,125,000 preferred, and its funded debt as of December 31, 1923, totaled \$9,526,655 of which over half was constituted by the series C bonds.

KENTUCKY & INDIANA TERMINAL.—Authority for Bond Authentication Denied.—The Interstate Commerce Commission has denied this company's application for authority to procure the authentication and delivery of \$426,600 of first mortgage bonds, representing the estimated cost of proposed capital expenditures. The report says the record does not show that public interest will be served by having bonds authenticated in respect of estimated proposed expenditures.

LEHIGH & HUDSON RIVER.—Excess Income.—The Interstate Commerce Commissions has assigned a hearing at Washington on January 4, 1926, before Examiner Haley, for the purpose of receiving evidence regarding this company's excess income reports.

LONGVIEW, PORTLAND & NORTHERN.—Securities.—This company has applied to the Interstate Commerce Commission for authority to issue \$500,000 of capital stock and to issue and sell \$3,250,000 of first mortgage 6 per cent bonds.

MADISON COUNTY.—Abandonment.—This company has applied to the Interstate Commerce Commission for authority to abandon and junk its line from Runion to Belva, N. C., 7 miles.

MISSOURI & ILLINOIS BRIDGE & BELT.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1919, placing the final value for rate-making purposes of the property owned and used for carrier purposes at \$862,000.

NEW ORLEANS, TEXAS & MEXICO.—Acquisition. This company has asked the Interstate Commerce Commission for authority to acquire control of the Sugarland, the Asherton & Gulf and the Rio Grande City, through the purchase of their capital stock amounting to \$1,700,000, and the San Antonio, Uvalde & Gulf, the Asphalt Belt and the Live Oaks Pipe Line, for which it will pay \$3,000,000.

NEW ORLEANS, TEXAS & MEXICO.—Acquisition.—This company has applied to the Interstate Commerce Commission for authority to acquire control by purchase of stock of five short line railroads, including the San Antonio, Uvalde & Gulf, 318 miles, running from San Antonio to Corpus Christi, Tex., the Asphalt Belt, the

Sugarland, the Asherton & Gulf, the Rio Grande City and the Live Oak Pipe Line.

NEW ORLEANS, TEXAS & MEXICO.—1924 Earnings.—The annual report for 1924 shows net income after charges of \$1,725,558 as compared with \$1,377,596 for 1923. Selected items from the income statement follow:

	NEW ORLEANS, TEXAS & MEXICO		
	1924	1923	Increase or decrease
Average mileage operated.....	921.74	921.74	.....
Railway Operating Revenues.....	\$14,251,547	\$11,911,420	\$2,340,126
Maintenance of way.....	\$2,480,419	\$1,793,529	\$686,890
Maintenance of equipment.....	1,879,741	1,718,845	160,897
Transportation	3,588,280	3,132,761	455,519
Total operating expenses.....	\$8,846,612	\$7,456,564	\$1,390,048
Net revenue from operations.....	\$5,404,935	\$4,454,857	\$950,078
Railway tax accruals.....	727,139	764,158	—37,019
Total operating income.....	\$4,911,143	\$3,921,277	\$989,277
Hire of freight cars—debit balance..	\$495,267	*\$3,381	\$498,647
Equipment rents	168,601	162,894	5,708
Joint facility rents.....	302,184	311,093	—8,909
Net railway operating income.....	\$3,945,091	\$3,450,671	\$494,420
Non-operating income	34,853	325,126	—290,274
Gross income	\$3,979,944	\$3,775,797	\$204,147
Interest on funded debt.....	\$1,027,320	\$1,166,679	—\$139,359
Total deductions from gross income.....	\$1,216,188	\$1,347,644	—\$131,456
Net income	\$2,763,756	\$2,428,153	\$335,603
Dividends appropriations of income.....	\$1,038,198	\$1,050,558	—\$12,360
Surplus for year carried to profit and loss	\$1,725,558	\$1,377,596	\$347,963

* Credit.

NEW YORK, CHICAGO & ST. LOUIS.—Proceeding on Interlocking Directors Reopened.—The Interstate Commerce Commission, on further consideration of the record and on a petition filed by the so-called Scott committee representing minority stockholders of the Chesapeake & Ohio who are objecting to the granting of the Nickel Plate application for authority to acquire control of the Chesapeake & Ohio and other roads, has ordered a re-opening of the proceeding in which it, on January 27, 1923, authorized seven directors of the Nickel Plate to become directors of the Chesapeake & Ohio. It has also allowed the Scott committee to intervene and become parties to the case.—The hearing on the Nickel Plate unification application was resumed at Washington on June 17, when a number of coal operators were called as witnesses to testify as to the effect of the proposal on the handling of coal traffic and the improvement in service on the Chesapeake & Ohio since the Van Sweringen interests acquired control of it. Cross-examination of O. P. Van Sweringen, who had testified at the last hearing, was postponed until June 18.

NEW YORK, PITTSBURGH & CHICAGO.—Baltimore & Ohio Objects.—The Baltimore & Ohio has filed a reply to the Interstate Commerce Commission's questionnaire expressing opposition to the granting of a certificate for the construction of this company's proposed line from Allegheny to Easton, Pa. The Baltimore & Ohio says there would be little if any new development and consequently little if any traffic would be created by reason of the construction of the line and that such business as it would handle would be of necessity withdrawn from the existing lines. It added that the line could only be built at excessive cost and that additional facilities when needed can be more cheaply secured by the improvement and more extensive use of present lines. "Greatly enlarged capacity can also be realized," it stated, "through the development with little additional expenditure of the suggested through route through Williamsport, Clearfield, DuBois, Butler, etc., with relatively low grades." The statement also pointed out that if the estimated cost of the proposed line, \$273,000,000 had been added to the property investment of the trunk line carriers their return on property investment for 1924 would have been reduced from 4.69 to 4.47 per cent.

NORFOLK & PORTSMOUTH BELT LINE.—Promissory Note.—The Interstate Commerce Commission has granted authority for the issuance of a one-year 6 per cent promissory note for \$50,000 in renewal of a promissory note maturing July 16, 1925.

NORFOLK & WESTERN.—Virginian Lease Opposed.—The City Council of Norfolk, Va., has employed attorneys to oppose the

lease of the Virginian to the Norfolk & Western. The city joined with the State Corporation Commission some weeks ago in a petition to the Interstate Commerce Commission opposing the lease. It was stated that the council would also be opposed to the absorption of the Virginian by the Chesapeake & Ohio, if such should later be proposed.

NORTHERN PACIFIC.—Abandonment.—This company has applied to the Interstate Commerce Commission for authority to abandon its Red Mountain branch, extending from a point near Helena, Mont., to Rimini, 12.85 miles.

NORTHERN PACIFIC.—Six Months' Guaranty Overpaid.—The Interstate Commerce Commission has issued a final certificate placing the amount of this company's guaranty for the six months' period following the termination of federal control at \$10,905,094, but as partial advance payments amounted to more than this it finds that the company owes the government \$1,269,905.

ORANGE & FREDERICKSBURG.—Successor Company.—A charter has been granted by the Virginia Corporation Commission to this company which will operate the 38 mile line between Fredericksburg, Va., and a point near Orange, formerly operated by the Potomac, Fredericksburg & Piedmont. The Virginia State Corporation Commission recently granted a petition of the owners of the latter property for an order of dissolution. The capital stock of the new company will be from \$50,000 to \$100,000, divided into shares of \$100 par value. Officers named in the charter are P. H. Faulconer, Charlottesville, president and treasurer; R. L. Biscoe, Fredericksburg, vice-president; C. L. Young, Rhoodsville; secretary, and V. R. Shackelford, Orange, general counsel. These four officers will constitute the board of directors.

PENNSYLVANIA, OHIO & DETROIT.—Consolidation.—The Interstate Commerce Commission has made public a proposed report by Examiners C. E. Boles and A. C. Devoe, following a hearing on their previous report, recommending findings by the commission that it has no jurisdiction to authorize the proposed acquisition by this company of a number of subsidiaries of the Pennsylvania by consolidation; that public convenience and necessity have not been shown to require the operation by it of the roads in question nor the acquisition and operation of the roads by the Pennsylvania; and that the proposed issue of stock by this company is not for a lawful purpose within its corporate purposes.

PONTIAC, OXFORD & NORTHERN.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1917, placing the final value for rate-making purposes of the property owned and used for carrier purposes at \$1,480,000.

READING COMPANY.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to extend the time of payment of \$1,000,000 first mortgage 4 per cent bonds issued by the Shamokin, Sunbury & Lewisburg until July 1, 1975, with interest at 4 per cent, and \$1,000,000 of second mortgage 6 per cent bonds until July 1, 1945, at 5 per cent.

ST. LOUIS & HANNIBAL.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1918, placing the final value for rate-making purposes of the property owned and used for carrier purposes at \$1,928,770.

ST. LOUIS SOUTHWESTERN.—Bonds.—This company has applied to the Interstate Commerce Commission for authority to nominally issue \$1,080,000 of first terminal and unification mortgage bonds.

UTAH.—Tentative Valuation.—The Interstate Commerce Commission has issued a tentative valuation report as of June 30, 1919, placing the final value for rate-making purposes of the property owned and used for carrier purposes at \$4,943,700.

WASHINGTON & LINCOLNTON.—Promissory Notes.—The Interstate Commerce Commission has granted authority for the issuance of \$18,000 promissory notes in connection with the purchase of one locomotive.

Trend of Railway Stock and Bond Prices

	Last June 16	Last Week	Last Year
Average price of 20 representative railway stocks	80.13	79.15	66.23
Average price of 20 representative railway bonds	91.38	91.36	87.60

Railway Officers

Executive

Marius de Brabant, assistant traffic manager of the Union Pacific, with headquarters in Los Angeles, Cal., whose retirement was reported in the *Railway Age* of June 6, has been appointed vice-president of the Verde Tunnel & Smelter Railroad, with headquarters in Clarkdale, Ariz.

Frank Mulks, who has been promoted to assistant to the executive vice-president of the Southern Pacific, with headquarters at San Francisco, Cal., a newly created position, was born on September 10, 1887, in Chesterhill, Ohio. He entered railway service in July, 1905, in the construction department of the Oregon Washington Railroad & Navigation Company in eastern Oregon and on January 1, 1906, he entered the employ of the Pacific Electric Company in the treasury department at Los Angeles, Cal. From the latter date until September 1, 1918, he occupied various positions in the treasury, accounting and executive departments. On the latter date he was transferred to the executive department of the Southern Pacific at San Francisco, Cal., where he was employed until January 1, 1920, when he was promoted to office manager in the executive department, which position he has held until his recent promotion.



Frank Mulks

Financial, Legal and Accounting

Charles W. Bunn, who has retired as general counsel of the Northern Pacific, with headquarters at St. Paul, Minn., was born on May 31, 1855, in Wisconsin. He was graduated from the University of Wisconsin in 1874 and from the law school of the same university in 1875. He entered railway service in June, 1896, as general counsel of the Northern Pacific. He was later elected vice-president and general counsel, which position he held until his recent retirement from active service. Mr. Bunn will continue as vice-president and special counsel. **D. F. Lyons**, who has been promoted to general counsel of the Northern Pacific, was born on February 15, 1880, at Danvers, Mass., and was graduated from Dartmouth College in 1902. He later studied law at the University of Minnesota and was graduated in 1906. After five years spent in general practice Mr. Lyons in 1911 entered the law department of the Northern Pacific. After successive promotions he was promoted to general solicitor, with head-



D. F. Lyons

quarters at St. Paul, Minn., where he remained until his recent promotion to general counsel.

J. R. Pritchard has been elected assistant secretary of the Norfolk Southern, with office at Norfolk, Va.

B. W. Scandrett, assistant general solicitor of the Northern Pacific, with headquarters at St. Paul, Minn., has been promoted to general solicitor, with the same headquarters, succeeding **D. F. Lyons**, promoted. Mr. Scandrett was born on March 3, 1883, at Faribault, Minn., and attended the University of Minnesota from 1900 to 1902. He was graduated from the Washburn College School of Law in 1906 and entered railway service in October of the following year as assistant attorney of the Union Pacific for Kansas and Missouri. He was promoted to assistant general attorney, with headquarters at Omaha, Nebr., in 1913, and held that position until 1917 when he was appointed general attorney of the Northern Pacific, with headquarters at St. Paul. Mr. Scandrett was promoted to assistant general solicitor in 1920 and continued in that capacity until his recent promotion to general solicitor.

Operating

J. Russell has been appointed superintendent of the St. Paul Union Depot Company, with headquarters at St. Paul, Minn.

W. J. Warnick, acting superintendent of the Toronto, Hamilton & Buffalo, has been appointed superintendent, succeeding H. T. Malcolmson, promoted.

S. S. Brooks has been appointed superintendent of the Coster division of the Southern, with headquarters at Knoxville, Tenn., succeeding **W. M. Deuel**, who has been appointed special representative to the general superintendent of the Middle district, with the same headquarters.

O. F. Ohlson, acting superintendent of the St. Paul division of the Northern Pacific, has returned to his duties as assistant superintendent of the Montana division, with headquarters at Billings, Mont. **D. E. Nichols**, acting assistant to the general superintendent of the Central district, with headquarters at Livingston, Mont., has been appointed assistant to the general superintendent of the district.

J. E. Slater, formerly special assistant to the general manager of the New York, New Haven & Hartford, has been appointed assistant to general manager. **E. B. Perry**, supervisor of wage schedules, has been appointed to a similar position. In his new capacity Mr. Slater will represent the general manager in all budget matters and will have charge of the analysis of operating performances and costs, while Mr. Perry will represent the general manager on matters affecting wages, working conditions and group insurance.

H. A. Moynihan, assistant superintendent of the Central New England, with headquarters at Maybrook, N. Y., has been promoted to superintendent of the Old Colony division of the New York, New Haven & Hartford, with headquarters at Taunton, Mass., succeeding **H. E. Astley**, who has been transferred to the Midland division, with headquarters at Boston, Mass. Mr. Astley succeeds F. S. Hobbs, who has been assigned to other duties. The jurisdiction of **G. W. Clark**, assistant superintendent of the Central New England, with headquarters at Poughkeepsie, N. Y., has been extended to cover the entire road. **R. M. Smith**, assistant superintendent of the New Haven at New London, Conn., has been appointed superintendent of the New Haven and New London divisions, succeeding **E. E. Regan**, promoted. **J. F. Doolan** succeeds Mr. Smith as assistant superintendent.

W. H. Tobey, who has been promoted to superintendent of the Smithers division of the Canadian National, with headquarters at Prince Rupert, B. C., was born on January 15, 1880, at North Berwick, Me. After being graduated from Brown University he entered railway service in 1902 as an instrument-man on location and construction on the Wabash. He was employed as a draftsman on the Canadian Pacific in Ontario in 1904 and entered the service of the Grand Trunk Pacific, now a part of the Canadian National, two years later as

resident engineer on construction in Saskatchewan and British Columbia. Mr. Tobey was promoted to assistant engineer on construction in 1910 and in 1914 was promoted to resident engineer maintenance of way. He was promoted to division engineer maintenance of way of the Smithers division in 1920, and held that position until his recent promotion to superintendent.

Edward E. Regan, who has been appointed acting general superintendent, Lines West, of the New York, New Haven & Hartford, has been in the service of the company from the beginning of his railroad work 32 years ago. He started his first job as a messenger and clerk on June 13, 1893. Subsequently he was promoted to stenographer, and to superintendent's clerk, crew dispatcher and chief clerk. He became assistant general yardmaster in 1908, general yardmaster in November, 1909, and a month later was promoted to assistant trainmaster. In January, 1912, he became acting trainmaster, and in May, 1912, trainmaster. In March, 1916, he was superintendent of the Midland division, and in May, 1917, superintendent of the New London division. In March, 1918, he became superintendent of the New Haven division, and in November, 1918, superintendent of the New Haven and New London divisions, which position he held until his recent promotion.

H. T. Malcolman, acting general manager of the Toronto, Hamilton & Buffalo, has been appointed general manager to succeed F. F. Backus, who has assumed lighter duties owing to ill-health. Mr. Malcolman was born on May 22, 1877, at Hamilton, Ont., and was educated in the public schools. He entered railway service in April, 1899, with the Grand Trunk at Toronto, Ont. From September, 1899, to June, 1903, he held various clerical positions with the Toronto, Hamilton & Buffalo, and from the latter date until March, 1912, he was chief clerk to the general superintendent. At this time he became car accountant of the same road, and held this position until January, 1914, when he became superintendent of car service. From April, 1914, until the early part of 1925 he was superintendent, at which time he became acting general manager. He held this position until his recent appointment as general manager.

Frederick F. Backus, general manager of the Toronto, Hamilton & Buffalo, with headquarters at Hamilton, Ont., has retired from this position owing to ill-health and will hereafter perform under the direction of the president such special duties as his condition will permit, with the title of executive assistant. Mr. Backus was born on June 4, 1860, at Rochester, N. Y., and was educated in the public schools and in business college. He entered railway service in June, 1876, with the



Edward E. Regan



H. T. Malcolman

Merchants' Despatch Transportation Company. From 1877 to 1881, he was clerk in the local freight office of the New York Central & Hudson River, and from 1881 to 1883, was chief clerk to the general northwestern agent of the Lehigh Valley at Rochester, N. Y. In 1883 he became traveling freight agent of the same road, with headquarters at Buffalo, N. Y., which position he held until 1885, when he became assistant claim clerk in the general office of the Blue Line at Rochester, N. Y. From October, 1886, to April, 1887, he was assistant to the general agent of the same road at Toronto, and from April, 1887, to December, 1897, he was general agent of the Blue Line and Canada Southern Line at Toronto. At this time he became general freight and passenger agent of the Toronto, Hamilton & Buffalo and held this position until July, 1912, when he was promoted to general traffic manager. In June, 1915, he became assistant to the president and in May, 1917, was promoted to general manager, which position he held at the time of his designation as executive assistant.

L. B. McDonald, who has been promoted to assistant general manager of the Southern Pacific, lines in Texas, with headquarters at Houston, Tex., was born on August 26, 1883, at Wylie, Tex. After graduation from college he entered railway service in May, 1902, in the accounting department of the Southern Pacific in Texas. He was promoted to chief clerk to the division engineer and the division superintendent in February, 1906, and held that position until August, 1909, when he was promoted to assistant superintendent at Victoria, Tex. Mr. McDonald was promoted to superintendent of terminals at Houston, Tex., in November, 1912, where he remained until April, 1917, when he was promoted to superintendent of the El Paso division. In September, 1918, he was transferred to the Houston division, with headquarters at Houston, Tex., and continued in that position until his recent promotion to assistant general manager.



L. B. McDonald

Traffic

T. D. Hobart, general coal freight agent of the Norfolk & Western, has retired after 38 years of service.

W. P. Ballard, superintendent of the Visalia Electric, with headquarters at Exeter, Cal., has been appointed general industrial agent of the Southern Pacific, with headquarters at San Francisco, a newly created position.

E. L. Taylor has been appointed assistant to the vice-president of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., and will act as secretary of the road's committee on industrial development of which Vice-president A. P. Russell is chairman.

C. W. Wiegel, general baggage agent of the Denver & Rio Grande Western, with headquarters in Denver, Colo., has been appointed supervisor of mail, baggage and express, a newly created position, with the same headquarters. The position of general baggage agent has been abolished.

F. H. Law, who has been promoted to general freight agent of the Illinois Central, with headquarters at Chicago, was born on November 10, 1876, at Sheridan, Ill. He entered railway service in August, 1897, in the freight department of the Illinois Central and later held various positions in the traffic department until July, 1907, when he was promoted to commercial agent at St. Louis, Mo. Mr. Law was transferred to Pittsburgh, Pa., in October, 1909, where he remained until

February, 1912, when he was promoted to assistant general freight agent at Memphis, Tenn. He was transferred to St. Louis, Mo., in February, 1913, and in February, 1918, was transferred to Chicago. He remained there until his recent promotion to general freight agent.

E. F. Jacobson has been appointed general agent of the New York, Chicago & St. Louis, with headquarters at Chicago, succeeding **A. B. Bierdeman**, transferred to Pittsburgh, Pa. **F. J. Blaicher** has been appointed general agent, freight department, with headquarters at Tulsa, Okla., succeeding Mr. Jacobson.

C. C. Cameron, who has been promoted to assistant freight traffic manager of the Illinois Central, with headquarters at Chicago, entered railway service as a boy in the freight department of the Wabash at St. Louis, Mo. He was employed as a clerk in the general freight office of the Illinois Central at New Orleans, La., in November, 1894, and after holding various other positions, was promoted to assistant general freight agent at Louisville, Ky., in 1899. He was promoted to general freight agent of the southern lines, with the same headquarters, in 1903, where he remained until 1905 when he was transferred to Memphis, Tenn. Mr. Cameron was transferred to Chicago as general freight agent of

the northern and western lines in 1907, which position he held, with the exception of a period of five years when he served as coal traffic manager until his recent promotion to assistant freight traffic manager.

Mechanical

Henry P. Hass, who has been appointed assistant to the mechanical manager of the New York, New Haven & Hartford, is a graduate of Sheffield Scientific School, Yale University, of the class of 1907. He began railroad work on July 1, 1907, when he entered the service of the New York, New Haven & Hartford as a special apprentice. Two years later he was appointed material inspector and on December 1, 1911, he became chief material inspector. On February 1, 1916, he was appointed engineer of tests, which position he held until his appointment as office assistant to the mechanical manager on December 1, 1923. He continued in this position until his recent change



Henry P. Hass

of title. **Kenneth Cartwright**, who has been appointed assistant mechanical engineer in charge of specifications, designs, records and standards of equipment of the New York, New Haven & Hartford, was graduated from the Massachusetts Institute of Technology as a mechanical engineer in 1912. He began his railroad career as a material inspector for the New Haven in June, 1914. In June, 1918, he left the railroad to become a

junior lieutenant in the Navy. He returned to the railroad in February, 1920, as assistant to the engineer of tests and general mechanical inspector. On May 16, 1924, he was appointed chief mechanical inspector, which position he held until his recent appointment.

John T. Grow, who has been appointed district master car builder of the New York Central, with headquarters at Albany, N. Y., was born on March 30, 1887, at Buffalo, N. Y., and was later graduated from the Masten Park High School, Buffalo, N. Y.

He entered railway service on September 6, 1904, as a laborer in the planning mill of the East Buffalo Car Shops of the New York Central. In 1907, he was promoted to mechanic, and in 1908, to piece-work inspector. He became foreman at Corning, N. Y., in 1912, and held this position until 1915, when he was transferred as foreman to Clearfield, Pa. From 1917 to 1923, he was assistant shop superintendent at Avis, Pa., and at that time became

assistant district master car builder at Albany, N. Y., which position he held at the time of his recent appointment.

A. McDonald has been appointed acting superintendent of motive power shops—Montreal, with headquarters at Montreal, P. Q., succeeding **G. M. Wilson**, who has been assigned to other duties.

George A. Moriarty, who has been appointed general mechanical superintendent of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., began his railroad career in 1887, when he started as a machinist's apprentice on the Baltimore & Ohio. In March, 1891, he went to the Pittsburgh, Cincinnati, Chicago & St. Louis (Pennsylvania) as a machinist and served in this capacity subsequently with the Baltimore & Ohio, the Louisville & Nashville, the McNamar Machine Company, the Cincinnati, New Orleans & Texas Pacific, Jefferys Machine Company, again with the Baltimore & Ohio, the Cleveland, Cincinnati, Chicago & St. Louis and the Columbus Ma-



G. A. Moriarty

chine Works. In September, 1895, he again went with the Baltimore & Ohio as machine shop foreman. In September, 1898, he again left that railroad, returning in July, 1899, as assistant roundhouse foreman. In February, 1901, he was promoted to roundhouse foreman and continued in that capacity until June, 1903, when he went to the Erie in a similar capacity. In 1904, he was promoted to general foreman and in October, 1906, to master mechanic. In 1907, he went to the New York, New Haven & Hartford as master mechanic, was promoted in January, 1917, to general master mechanic, Eastern grand division, and four months later to mechanical superintendent, Lines East, in which position he continued until his present promotion.

Frank E. Balda, who has been appointed mechanical superintendent, Lines East, of the New York, New Haven & Hartford, with headquarters at Boston, began his railroad service as a machinist's apprentice with the New York, West Shore & Buffalo (New York Central) in 1885. In November, 1889, he went to the Erie as a machinist and in January, 1890, to the New York, Chicago & St. Louis in the same capacity. Three months later he returned to the West Shore as a machinist and a year later was promoted to foreman. In May, 1896, he went to the Fitchburg as foreman. In 1897 he became a machinist for the New York, New Haven & Hartford, and the following year was promoted to roundhouse foreman. In March, 1904, he became assistant general foreman and in March, 1908, general foreman. In March, 1912, he was promoted to master mechanic and in May, 1915, to superintendent of shops at New Haven. In September 1918 he became superintendent of shops at Readville, and in August, 1923, assistant to the general mechanical superintendent. In December, 1923, he was appointed assistant to the mechanical manager, which position he held at the time of his recent promotion.



Frank E. Balda

Engineering, Maintenance of Way and Signaling

D. A. Young has been appointed valuation engineer of the Chicago River & Indiana, the Chicago Junction and the Indiana Harbor Belt, with headquarters at Chicago, Ill., succeeding **A. A. Schmidt**, who has resigned to accept service with another company.

C. A. Knowles, who has been appointed valuation engineer of the Chesapeake & Ohio, with headquarters at Richmond, Va., was born in Buffalo, N. Y., on February 23, 1883, and was later graduated from the Niagara Falls High School. He began his engineering work in April, 1902, as a rodman on maintenance of way work, and from that time until 1910, he was employed for the major part on railroad location and construction in various capacities from rodman to resident and assistant engineer in charge of construction. From 1910 to 1912 he was employed as assistant engineer in connection with municipal construction and maintenance work and with construction work for the State of Connecticut, for the most part highway and railroad facilities. In 1912 he engaged in railroad work in connection with the design and standardization of track and structural details, and for a time was engineer in charge of railroad location work in Central America. From 1914 to 1924, except for a period during 1918 and 1919, when he was with the United States Army Engineers, he was with the Engineering Section, Bureau of Valuation, Interstate Commerce Commis-



C. A. Knowles

sion. Until his recent appointment Mr. Knowles was assistant valuation engineer of the Chesapeake & Ohio.

C. R. Wright, division engineer on the Nickel Plate district of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, has been promoted to district engineer of the Nickel Plate district, with headquarters at Indianapolis, Ind., succeeding J. C. Wallace, promoted. **W. H. Burrage** has been appointed division engineer at Cleveland, succeeding Mr. Wright.

Louis Yager, assistant chief engineer of the Northern Pacific, with headquarters at St. Paul, Minn., has taken over the duties of **S. J. Bratager**, assistant chief engineer, who retired on June 1, on account of ill-health. **Lowry Smith**, assistant division engineer, with headquarters at St. Paul, has been promoted to office engineer, with the same headquarters. **T. H. Lantry**, who has been on leave of absence, has resumed his duties as general superintendent of the Central district of the Northern Pacific, with headquarters at Livingston, Mont. **T. F. Lowry**, acting general superintendent of the Central district has resumed his duties as superintendent of the St. Paul division, with headquarters at Minneapolis, Minn.

A. C. Harvey, who has been promoted to chief engineer of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, was born on December 24, 1883, at Mansfield, N. Y., and was graduated from Purdue University in 1908. Before his graduation from college he had been employed as a rodman and draftsman in the engineering department of the New York, Chicago & St. Louis, and he returned to that company in June, 1908, as a rodman and transitman on station ground surveys between Cleveland, Ohio, and Buffalo, N. Y. In March, 1909, Mr. Harvey was promoted to assistant engineer on a grade crossing elimination project where he remained until March, 1910, when he was placed in charge of a double track survey in New York and Pennsylvania. A few months later he was placed in charge of track elevation at Grand Crossing, Ill., and he continued there until June, 1916, when he was put in charge of field work on a grade crossing elimination project in Cleveland. Mr. Harvey was promoted to field engineer at Cleveland, Ohio, in January, 1917, and in September, 1918, was promoted to engineer of grade crossing elimination, in charge of the west side grade crossing elimination at Cleveland. He was promoted to assistant chief engineer of the Nickel Plate district in December, 1921, and in August, 1924, was given jurisdiction over the Lake Erie and Western district also. He continued in that capacity until his recent promotion to chief engineer of the Nickel Plate and Lake Erie and Western districts.

Special

Dr. F. E. Smith has been appointed chief surgeon of the Wabash, with headquarters at Decatur, Ill., succeeding Dr. M. P. Parrish, deceased.

Obituary

C. A. Wirth, master mechanic on the Northern Pacific, with headquarters at Pasco, Washington, died in that city on June 1.

S. W. Mullinix, superintendent of shops of the Chicago, Rock Island & Pacific, with headquarters at Silvis, Ill., died on June 12 in Moline, Ill., following a stroke of paralysis.

David W. Ross, formerly purchasing agent and later general superintendent of transportation of the Illinois Central, who left railway service in June, 1905, died in New York, on June 10.

Julius Kruttschnitt, who retired as chairman of the executive committee of the Southern Pacific on June 1, died in a New York hospital on June 15, as the result of a heart attack which he suffered following a minor operation. A sketch of Mr. Kruttschnitt's railroad career, which was written in connection with his recent retirement, was published in the *Railway Age* of June 13, page 1459.